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ABSTRACT

This document contains the proceedings from the London conference on geography and environmental education sponsored by the International Geographical Union (IGU) Commission on Geographical Education. Papers include: (1) "The Ecocitizen: A Challenge to Environmental and Geographical Education" (Haubrich, Hartwig); (2) "Learning To Teach about Environmental Issues in Geography" (Corney, Graham); (3) "Through Whose Eyes? Confronting the Environmental Dilemma in Geographical Education" (Van-Harmelen, Ursula); (4) "How Does the Geography Teacher Contribute to Pupils' Environmental Education?" (Reid, Alan); (5) "Fieldwork and the Development of Thinking Skills in Geography and Environmental Education" (Foskett, Nick); (6) "Interdisciplinary Urban River Studies: The Chicago River" (Giles, John H.; Parson, Chris); (7) "The Local Landscape and Fieldworks in Teaching Geography in Finnish Schools" (Lahti, Leena); (8) "'Caves and Waves'--What Do Adventurous Experiences During Field Trips Mean to Pupils?" (Lai, Kwok Chan); (9) "It Is the Question: To Do Good Research and To Do Research Well" (Van der Schee, Joop); (10) "Finnish-NW Russian Environmental Education in St. Petersburg: The Starting Phase of an Action Research Project" (Lappalainen, Annikki; Godenhjelm, Mette; Houtsonen, Lea; Malmberg, Heli; Smirnova, Lioudmila); (11) "Adapting the Geographic and Environmental Education Model to Engineering and Technical Education" (Sacks, Arthur B.; Amery, Hussein A.); (12) "Geography's Current and Future Role in Environmental Education: A New Zealand Perspective" (Logie, June); (13) "Environmental Education--Perspectives from Colombia" (Aristizabal, Ana Maria Duque); (14) "Expo '98 Influence on Environmental Education in Portuguese Schools" (Ferreira, Manuela; Miranda, Branca); (15) "Social Justice and Environmental Concerns: The Case of South Africa" (Ramutsindela, Maano); (16) "Fitting Environmental Education (EE) into the Greek Educational System: The Organisation and Development of an In-Service Training Programme for Secondary Teachers" (Panagiotou, Apostolis); (17) "Making Issues-Based Enquiry a Reality in South African Secondary School Geography through Cooperative Fieldwork" (Wilmot, Di); (18) "Student Environmental Activism in the Contexts of Age and Gender" (Isaac, M.; Williams, Michael); (19) "Museum Evaluation and the 'Ecolia' Project" (Iguchi, Jack); (20) "Environmental Literacy and Decision Making: A Challenge for Low Illiterate Societies?" (Daudi, Sabiha); (21) "The Role of Women's Social Representations in an Urban

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Environmental Education Programme in Manaus, Amazonas, Brazil" (Storey, Christine); (22) "The Making of a Multimedia Resource" (Waumsley, Lorraine); (23) "Attitudes of Portuguese Secondary School Pupils in Relation to Hazardous Waste Disposal and Treatment" (Alexandre, Fernando; Ferreira, Manuela); (24) "Public Understanding of Air Quality Information in Thailand" (Dillon, Justin; Watson, Rod; Suwannotachote, Rapeepun); (25) "The Case for Values Awareness in Environmental Higher Education" (Merritt, J. Quentin; Jones, Peter C.; Palmer, Clare); (26) "Environmental Education in Russian Universities" (Romanova, Emma; Kasimov, N.S.); (27) "Common Themes across a Varied Geography: A First Look at Theory and Practices of Biodiversity Education in Canada" (Kelsey, Elin); (28) "Ecological Education in Russia as a Geographical Problem" (Lyubarsky, Alexander); and (29) "A Rising Tide: Promoting Care and Understanding of Our Oceans through Geographical Science, Research and Environmental Education" (Heeps, Carolyn). (CCM)

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IGU Commission on Geographical Education

London Conference

Geography and Environmental Education : International Perspectives

11-13th April 1999

Proceedings

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Director Professor Peter Mortimore OBE

April 1999

Dear Colleagues

Welcome to The Institute of Education and the IGU Conference on 'Geography and Environmental Education : International Perspectives'!

On behalf of the British Sub-Committee of the IGU Commission on Geographical Education and my colleagues in the Geography Department here at the Institute of Education, University of London we wish you an enjoyable and worthwhile conference.

Yours sincerely

W. Ashley Kent.

Conference Organiser
Chair of the British Sub-Committee

Geography at the Institute of Education

Education, Environment and Economy Group. Since September 1995 geography has become part of this new grouping along with colleagues in business and economics education. The group is actively engaged in collaborative teaching and research ventures to do with environmental education, development education and education for sustainability.
Head of Group: Dr Ashley Kent Tel: 0171 612 6437.

. **MA Geography in Education**. This modular course is usually undertaken by teachers part time over a two year period but it is possible to build up accreditation over four years. By arrangement it is possible to attend individual modules as part of continuing professional development. MA Course Tutor: Dr David Lambert Tel: 0171 612 6437.

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. **The Centre for 'A' Level Geography Curriculum Support.** Conferences for teachers and sixth formers are organised during the year. In addition, newsheets and resource sheets are regularly distributed to members teaching 'A' level geography. Administrator: Anne Loveday Tel: 0171 612 6455.

. **Remote Sensing in Geography Project.** Funded by the British National Space Centre and DfEE, this Project has been at the Institute since 1993. INSET courses support and advice are available and project packs were published by the Geographical Association in January 1995. Details from the Geography Secretary: Tel: 0171 612 6436.

. **5/10/20 Day GEST Primary Geography Courses.** These have been established since 1993 and are run in partnership with LEAs. Administrator: Sheila King Tel: 0171 612 6460.

. **INSET Courses.** Each year the Geography Department organises a number of short courses including: Geography for NQTs; Managing a Geography Department; IT and Geography; and Raising Student Achievement.
Administrator: Sheila King Tel: 0171 612 6460.

. **Geographical Association South East Region:** Since 1994 the Geography Association has funded a Regional Initiative. Conferences are organised and a newsheet produced.
Regional Coordinator: Sheila King Tel: 0171 612 6460.

. **Earth Science Technology Centre** (ESTC). The ESTC is a unique resource which allows students and teachers to actively experiment with dynamic hardware models which show physical and human processes and how they shape the landscape. A wide range of stimulating learning experiences for Key Stage 2, Key Stage 3, GCSE, A-Level and teachers. Tutor in charge: Stephanie Jackson Tel: 0171 612 6462. Director: David Balderstone. Tel: 0171 612 6431.

. **Eurogame** is a European Commission funded project. The aim of the project is to design, build and test a game-oriented, multilingual, multimedia tool for teaching and learning the regional geography of Europe.
Research Officer: Stephanie Jackson Tel 0171 612 6462 or Fax: 0171 612 6450

. **Other Activities.** These include pre-OFSTED and OFSTED inspections; development of a Group Teaching and Learning Centre; consultancy work of a variety of types such as raising student achievement; improving departmental effectiveness and links exist with the International School Effectiveness and Improvement Centre (ISEIC); Enquiries: Geography Secretary: Tel: 0171 612 6436.

Look us up on our Web Page: Http:/www.ioe.ac.uk

Sunday April 11th

8.30am onwards	Registration at John Adams Hall, 15-23 Endsleigh Street
9.30am	Coach leaves John Adams Hall Tour of London Docklands - led by Drs Ray and John Hall Lunch at Trafalgar Tavern, Greenwich Walking tour of Greenwich and Millennium Exhibition
4.00pm	Boat to Embankment Pier
5.30-7.30pm	Reception at Royal Geographical Society with the Institute of British Geographers, 1 Kensington Gore, London SW7 2AR

Monday April 12th

All papers will be presented in Room 801
Mid morning and afternoon breaks will be held in Room 802
Lunches to be held in Committee Room 1 (level 4)

Welcome followed by :

9.00am	Keynote presented by Professor Hartwig Haubrich **The Ecocitizen: a challenge to environmental and geographical education**
10.00 - 11.00	Chairperson - Nick Foskett *Graham Corney* Department of Educational Studies, University of Oxford **Learning to teach about environmental issues in Geography** *Ursula Van-Harmelen* Education Department Rhodes University South Africa **Through whose eyes? Confronting the environmental dilemma in geographical education** *Alan Reid* Department of Education University of Bath **How does the geography teacher contribute to pupils' environmental education?**
11.00 - 11.30	Refreshments
11.30 - 1.00	Chairperson - Andrew Powell *Nick Foskett* Research and Graduate School of Education, University of Southampton **Fieldwork and the development of thinking skills in geography and environmental education**

John H (Jack) Giles and Chris Parson
Illionois Geographic Alliance/National Geographic Society
Interdisciplinary urban river studies : the Chicago River
Leena Lahti
University of Joensuu, Savonlinna
The local landscape and fieldworks in teaching geography in Finnish schools
Kwok Chan Lai
The Hong Kong Institute of Education
"Caves and Waves" - What do adventurous experiences during field trips mean to pupils?

1.00 - 2.30 Lunch

2.30 - 3.30 Chairperson - Margaret Roberts

Joop Van der Schee
Free University, Netherlands
It is the question : To do good research and to do research well
Annikki Lappalainen, Mette Godenhjelm, , Lea Houtsonen , Heli Malmberg, Lioudmila Smirnova
University of Helskinki, Finland
Finnish-NW Russian environmental education in St. Petersburg : The starting phase of an action research project
Arthur B Sacks, Hussein A Amery
Colorado School of Mines, USA
Adapting the geographic and environmental education model to engineering and technical education

3.30 - 4.00 Refreshments

4.00 - 5.30 Chairperson - Simon Catling

June Logie
Royal Society of New Zealand Science and Technology Teacher Fellow - Aukland Girls' Grammar School
Geography's current and future role in environmental education : a New Zealand perspective
Ana Maria Duque Aristizabal
MPhil/PhD Student - Kings College, London
Environmental Education - Perspectives from Colombia
Manuela Ferreira , Branca Miranda
Universidade Aberta, Portugal
Expo '98 Influence on Environmental Education in Portuguese Schools
Maano Ramutsindela
Department of Geography, Royal Holloway
Social justice and environmental concerns : the case of South Africa

Tuesday April 13th 1999

9.00 Keynote presented by Professor Phillip Stott

10.00 - 11.00 Chairperson - Bill Marsden

Apostolis Panagiotou
PhD Student, Institute of Education, University of London
Fitting environmental education (EE) into the Greek educational system: the organisation and development of an in-service training programme for secondary teachers
Di Wilmot
Lecturer in Education, Rhodes University, South Africa
Making issues-based enquiry a reality in South African secondary school geography through cooperative fieldwork
M Isaac, Michael Williams
Department of Adult Continuing Education, University of Wales
Student environmental activism in the contexts of age and gender

11.00 - 11.30 Refreshments

11.30 - 1.00 Chairperson - Michael Williams

Jack Iguchi
Professor of Environmental Education, Graduate School of Environmental Sciences, Aomori University, Japan
Museum evaluation and the "ecolia" project
Sabiha Daudi
The Ohio State University, School of Natural Resources
Environmental literacy and decision making : a challenge for low llliterate societies?
Christine Storey
PhD Student, Institute of Education, University of London
The role of women's social representations in an urban environmental education programme in Manaus, Amazonas, Brazil
Lorraine Waumsley
Education Liaison Consultant, Buckinghamshire
The making of a multimedia resource

1.00 - 2.30 Lunch

2.30 - 3.30 Chairperson - Margaret Macintosh

Fernando Alexandre , Manuela Ferreira
Universidade Aberta, Portugal
Attitudes of Portugese secondary school pupils in relation to hazardous waste disposal and treatment

Justin Dillon, Rod Watson, Rapeepun Suwannotachote
Kings College, London
Public understanding of air quality information in Thailand
J Quentin Merritt, Peter C Jones , Clare Palmer
School of Humanities, University of Greenwich, London
The case for values awareness in environmental higher education

3.30 - 4.00 Refreshments

4.00 - 5.30 Chairperson - Sheila Morris

Emma Romanova, N S Kasimov
Moscow State University, Russia
Environmental education in Russian universities
Elin Kelsey
School of Education, Kings College, London
Common themes across a varied geography : a first look at theory and practices of biodiversity education in Canada
Alexander Lyubarsky
Institute for Postgraduate Education, Russia
Ecological education in Russia as a geographical problem
Dr Carolyn Heeps
Director, Centre for Coastal Conservation and Education, Bournemouth University
A rising tide: promoting care and understanding of our oceans through geographical science, research and environmental education

Details of Keynote Speakers

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Since 1969 : Professor für Geographic und ihre Didaktik in Koblenz and Freiburg
1974-1986: President of the German Hochschulverband für Geographic und ihre Didaktik
1988-1994: President of the International Geographic Union Commission on Geographical Education
Honorary Member of the IGU Commission on Geographical Education
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1997: Honoured by liber amicorum with 29 articles most in English:
Convey, A and H. Nolzen (editors) (1997) Geography and Education. in Muenchener Studien zur Didaktik der Geographie. München
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editor of numerous books and journals
author of numerous essays and books particularly on educational geography.
Most recent publication:
Haubrich, H. (1998) Geographie hat Zukunft. Wege der Geographie und ihre Didaktik. Kallmeyersche Verlagsbuchhnadlung. Seelze-Velber (price 29.90 DM)

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Philip Stott is Professor of Biogeography in the University of London, where he teaches in the Department of Geography at the School of Oriental and African Studies. He was Head of Department for some seven years. Professor Stott has researched on the ecology of the tropics for over twenty-five years and he is an authority on savannas and South East Asia. He is currently Editor of the internationally important "Journal of Biogeography" published by Blackwell Science at Oxford and he has just written a textbook, "Global Environmental Change", with Dr Peter Moore and Professor Bill Chaloner. Professor Stott also broadcasts widely and he was recently featured on BBC Radio 4's 'Frontiers'. He maintains a critical Web Site on tropical ecology at http://ourworld.compuserve.com/homepages/stott2 that has many links and educational resources.

THE ECOCITIZEN : A CHALLENGE TO ENVIRONMENTAL AND GEOGRAPHICAL EDUCATION

Hartwig HAUBRICH

Paedagogische Hochschule Freiburg-Germany

The paper starts with a collection of numerous "eco-terms" (ecological buzzwords) which can be found everyday in the mass media and which can illustrate the current position of ecology, ie. the "eco-trends" in our time. The analysis of these new terms, of the current ecological issues and last but not least of the published problem solving theories leads to two different directions:

1. The philosophy of eco-pessimism
2. The philosophy of eco-optimism

It is difficult to find eco-realism
The real existing ecocitizen is moving between eco-pessimism and eco optimism. Many empirical research projects found six groups of eco- behaviour:

1. Eco-behaviour is seen as a personal duty and development project.
   The leading idea is :
   Don't wait for others, start yourself!
2. Eco-behaviour is seen as the duty of all citizens
   The leading idea is :
   When I shall start, then all citizens have to join a common right eco-behaviour.
3. Eco-behaviour is seen as independent of the whole political and societal system.
   The leading idea is :
   My change of behaviour doesn't bring any effect when nothing happened "above" (government, business).
4. Eco-behaviour doesn't matter.
   The leading idea is :
   Let us live with the catastrophe and because of the catastrophe! Let us have fun!
5. Eco-behaviour is nonsense. Ecological problems don't exist, they are invented by green "spinners"
   The leading idea is :
   Let's go on and not back to the Stone Age!

These main eco-types can be found in a different percentage in different groups of people, but they can also be found in one person in different situations. So "greens" can commit to protect a nature reserve but at the same time smoke many cigarettes or drive a car even when it is not necessary.

To optimise the eco behaviour of ecocitizens, ecocitoyens or the homo oecologicus is a challenge to geographical and environmental education. The paper will therefore also discuss :
the necessary knowledge on basic interconnections of ecosystems,
the necessary knowledge on sustainability as the main ecological principle,
the necessary attitudes and abilities in different life situations.

The concept of an ecocitizen will be defined as a holistic understanding of human beings and nature.

The Ecocitizen:
a challenge to environmental and geographical education

Hartwig Haubrich
Paedagogische Hochschule Freiburg/Germany

Introduction

The ecological vocabulary of the mass media and of the everday language is nowadays full of eco-slogans. There are so many, that they can be used as indicators of the current „Zeitgeist" or of the state of ecology in the present public discussion of our societies. Therefore some optimists expect that the old homo oeconomicus will be replaced by a new homo oecologicus in the near future (Meinberg 1995). Others ask for the combination of three souls in the hearts of the citizens in the 21st century - namely the soul of the homo oeconomicus, the homo socialis and the homo oecologicus.

Where ever you look you can find new eco-terms from eco-audit to eco-taxes.

In **figure 1** I have tried to select such words and to bring them in a special order, to show the structure of my paper. My target is to discuss some basic ideas to build a fundament for the action competence of eco-citizens.

1. **Eco-trends**

The ecological perception of most citizens commutes between eco-pessismisme and eco-optimisme.

1.1. Eco-pessimisme

Eco-catastrophes and apocalyptic scenarios have been described so often that many people don't want to listen anymore as it is illustrated in **figure 2.** But alarming ecological signals cannot just be found in the nature but also in the society and in the individual person.

It is said: the individual becomes more and more ill because of the present ecological stress.

As proves are mentioned:

- weaker becoming immune-systems,
- increasing asthma and bronchitis
- growing allergic diseases
- more and more cancer
- decreasing of human fertility
- burn-out syndrom
- drug addicts
- growing depressions and aggressive behaviours.

It is said: the society is going to breake down. As proves are mentioned:

- the growing gap between poor and rich in North and South, in East and West and between Europeans regions
- the likely cancellation of the generation contract between old and young
- the decreasing cooperation between members of the same generation
- the growing numbers of war
- the debt crisis
- the increasing isolation and loneliness of many people
- the growing aggressivity and crime in many countries.

fig. 1

The Eco-Citizen
between Eco-Consciousness and Eco-Behaviour
(homo oecologicus - eco-citizen - ecocitoyen)

Eco-Trends
between
Eco-Pessimisme, - Optimisme and - Realisme
between
Eco-Sinners and Eco-Friends,
Eco-War and Eco-Peace

Eco-Policy
between
Eco-Taxes and Eco-Incentives,
Eco-Insurance, Eco-Label, Eco-Life, Eco-Invest
Eco-Fonds, Eco-Plus, Eco-Product .....

Eco-Behaviour
between
traditional and alternative lifestyles

Eco-Systems
between
Nature, Society and Individual
between
ecological, economical and social sustainability

Ecological Action Competence of Eco-Citizens

Quelle: Jules Stauber/CCC München

fig. 2 see nothing, hear nothing, talk nothing

fig. 3 Patterns of ecological behaviour

Ecologically correct behaviour is seen as:

1. „personal development project“

2. „citizen’s duty“

3. „system-dependent“

4. „indifferent“

5. „not acceptable“

It is said: Nature is going to die or at least becoming more and more ill. As proves are mentioned:

- the decreasing biological diversity
- erosion and deforestation
- nuclear and toxic waste
- the limits of sinks, i.e.of the ability of air, water and soil to assimilate emissions
- the greenhouse effect
- the ozone depletion
- the limits to growth

It wouldn't be difficult to enlarge this horror list, which isn't very pleasant for an ecological optimist. The question is: Who has written this problem catalogue - an eco-pessimist or an eco-realist?

1.2 Eco-pessimisme

Everyone perceives the everday news and the public opinions differently, but there are some signs that optimistic visions replace more and more pessimsitic reports on environmental issues. The „Waldsterben" is now more and more seen as unlikely. Even global warming is now described by some meteorologists as not scientifically proved. More and more publications contain optimistic visions of the future. William Knoke writes for example in his book on the placeless society in 1996:

„Copper, steel, lead and also oel will be substituted be new technologies in the near future as horseshoes, rubber and sail ships in the past.

Cars will contain no metal anymore, most parts will be made out of new ceramics. Motors will need neither air condition nor oel. 1-2 liters fuel will be sufficient for 100km and the emissions will be minimal. Electrical cables, generators and computers will be made out of superlight sicilicium, i.e. out of sand which can be found everywhere. The body of a car will be made out of organic material which can be recycled easily.

New designed bacteria will eat the sulphure which is emitted when coal is burned and which is today the cause of acid rain. Bio-metallurgists will develop bacteria which produce metals out of our waste - similar as bacteria produce cheese and beer.

From 1950 to 1990 the prices for raw material has decreased:

for energy 46%

for minerals 48%

for lumber 41%

for food 74%.

Because of new technolgies the reserves of commodities are increased in the same time span. 1950 15 kg copper has been needed for building one car, today one needs 5 kg.

One communication sattelite of 250 kg weight does the same work as 150 Mio kg transatlantic telephone cable."

William Knoke writes further:

„We are leaving the material-based ages - the stone age, the bronce age, the iron age and and the age of synthetic material - and are entering a dematerialised historical period. High sophisticated equipments will be made out of nearly nothing." (Knoke 1996,131ff)

When you read Michio Kakus book on future visions you want immediately to have some more lifes.

1.3 Eco-realisme

The term „eco-ralisme" hasn't been invented by the big business or by conservative political parties but by the ecological movement. The target is to develop a contrast programme against the environmental horror reports in the daily news. In face of joblessness and economic crisis many people are'nt interested anymore into ecological issues. For example the World-Wide-Fund for Nature tries to stay distant to the so called „eco-warriors" as Greenpeace and looks for developing new strategies of eco-realisme. They concentrate on realistic targets as the protection of tropical rainforests and temperate forests. They want a contract between economy, politics and ecology, in order to get progress and success in ecological areas.
How ever people may judge this new eco-realisme, in face of new regional and global disasters Fritz Reheis claims:

„May be that not every ecological trend is scientifically proved, but when we look carefully, we can find sufficient indicators to become highly alarmed. These alarm signals come out of ourselves, out of nature and out of our social environment. Because we don't have last security I recommend to be carefull and to believe more the eco-pessimists than the eco-optimists. To these eco-pessimists - or shall I say realists - belong 99 Nobel winners from all over the world which warned us in 1992 and claimed that mass migration, food shortage and ecological wars will happen in the near future."(Reheis 1996, 1ff)

2.0 **Eco-politics between eco-taxes and eco-incentives**

The change of ecological perceptions but also the state of ecology within our market-system can be found in many new eco-words as: eco-trend, eco-audit, eco-taxes, eco-incentives, eco-fonds, eco-life, eco-product, eco-label, eco-plus, eco-tech, eco-insurance, eco-bank, eco-freak, eco-war, eco-train etc.
This collection of eco-terms shows that ecology plays an important role in our time, although our time is a time of economic crisis and joblessness. These terms mirror the current „Zeitgeist" between economical and ecological priorities.
When eco-banks and eco-insurances offer special incentives - claiming to finance just ecologically-oriented development projects - it s not quite clear whether they follow this strategy in order to protect nature or whether they want to make a fortune that way.
Nowadays some household-insurances offer special advantages when clients buy appliances with an eco-label as for example water saving washing machines.
Car-insurances offer a so called eco-plus for members who behave ecologically correctly, for example who buy monthly a ticket to go by public traffic where ever possible. Eco-plus means less insurance fees.
Eco-life insurances give their clients a guarantee to invest their money just into exemplary ecological projects.
The discussion whether eco-taxes or eco-bonuses are the best strategy to protect the environment is not finished yet. If somebody transgresses legal emission limits he will be punished, but under the prescribed limits he can pollute the environment as he or she wishes. Normally there is no financial or other incentive to reduce the emissions under the emission limits. Eco-bonuses for decreasing the pollution under the official limits could become an important motivation to improve environmental technology and to protect the environment more efficiently.

The confidence into eco-procucts and eco-services is slowly becoming stronger but we cannot speak of a radical change of ecological behaviour. At least the great many of eco-buzzwords show that there is an eco-movement - sometimes intrinsically and sometimes extrinsically motivated.

3.0 **Patterns of ecological behaviour**

Ecological behaviour of citizens is dependent not just from their knowledge of ecological systems and their consciousness of neccessary behavioural change but also from the social group a person belongs to, i.e. from collective mentalities or everday consciousness and everday moral.

The congruence or incongruence of ecological demands with personal values makes it easier or more difficult to change the own ecological behaviour.

Angelika Poferl (1995) differentiates five different environmental mentalities and patterns of behaviour ***(figure 3)***.

3.1 Ecologically correct behaviour of people is seen as a „personal development project".

The ecological philosophy is seen as a symbol for another and better life than many current, materialistic lifestyles. Ecologically sustainable behaviour gives these people's life sense and quality and offers them moral orientation and personal development. Ecological behaviour is consciously seen as an antipole against the norms of the current society.

The motto of this ecological pattern reads:

Don't wait for others, start yourself!

3.2 Ecological behaviour is seen as „citizen's duty".

This behaviour is outside-oriented, i.e. it is influenced by other people, by the society and the state. If the state or government asks for obeying strong ecological laws and for a sustainable environmental order and moral, this behavioural group is ready to follow.

The environmental pattern „citizen's duty" can be differentiated into two subgroups:

The first one is extrinsically motivated. They behave ecologicallly conform, because they believe, it is their „citizen's duty".

The second one is intrinsically motivated. They behave ecologically correct, because they believe, correct environmetal behaviour is the symbol of a „modern, enlightened citizen".

The motto of this ecological pattern reads:

If I shall follow the ecoligical rules, then every citizen has to follow. But no extreme demands, please!

3.3 Ecological behaviour is „system-dependent".

This environmetal group sees its limits and chances in the structure and system of the society, economoy and government. The state has the duty to secure the ecological quality of the environment, the quality of life and the ecologically correct behaviour of all citizens. The individual is principly powerless. Not the individual moral is important, but the framework of ecological directives of the government.

The motto of this ecological pattern reads:

My personal commitment is worthless, when nothing happens „above", i.e. when the state doesn't change the rules.

3.4 Ecological behaviour is „indifferent".
This environmental group possesses a lot of ecological knowledge, but it doesn't behave accordingly. Intentionally these people don't draw any consequences out of their ecological insights. They claim, they aren't touched personally by environmental problems and therefore it wouldn't be necessary to change their environmental behaviour. They know this logical contradiction, but don't draw any consequences in their environmental behaviour.
The motto of this ecological type reads:
Let us live in face of the catastrophe and because of the catastrophe!
Let us have fun! No frustration please!
3.5 Change of ecological behaviour is not accepted.
This ecological type of people doesn't believe in any environmental problems. Therefore they claim that a change of their environmental behaviour wouldn't have any sense. They call those people who ask for environmetal correctness „crasy greens". Ecological demands are seen as a danger to the status quo, the reached standard of life and the current order.
The motto of this ecological pattern reads:
Let's go on! But not back to the stone ages!

The mentioned ecological behaviour patterns can be found in every age group and in every social layer of our societies - but differently in numbers.
The pattern „Ecological behaviour is seen as a development project" and the pattern „Ecological behaviour is indifferent" as well dominate under young people.
The first pattern often goes with alternative lifestyles.
The second pattern is often combined with a hedonistic philosophy or with a strong wish to make a successfull career.
The pattern „Let's go on! But not back to the stone ages!" can often be found in lower social layers and in uncritical conservative milieus.
Research outcomes show that the pattern „Ecological behaviour is citizen's duty" embraces the biggest group.
It is not quite clear whether males or females behave ecologically differently.
That the ecological sensitivity is stronger under academic people belongs now to the past.
May be somehow differently - but ecological consciousness can be found nowadays in every social circle from white to blue collar workers and from green to conservative parties.
Nearly every big party has now everday on its lips „the social and ecological market".
The patterns of ecological behaviour are not universal or holistic but parcelled , i. e. broken into different parts.
Who looks for health food, doesn't automatically drive less than necessary.
Who is strongly committed to nature preservation, doesn't automaticaly stop to smoke.
Who tells people the story of the „limits to growth", doesn't automatically avoid to visit far corners in the world by plane etc.
Ecological behaviour is splitted in the individual and in the society as well.
The earlier described groups of ecological behaviour show different accents. Many peole are mixtures of the mentioned types.

Space / Sun

resources

services

consumption

Earth Society Individual Society Earth

work

cooperation

sinks

fig. 4 Exchange Relations in the Eco-System „Human-Earth“

4. Eco-systems and sustainable development

Although many surveys have shown that ecological behaviour cannot be determined by ecological knowledge, it is clear that a sound environmental behaviour without knowledge of ecological interrelationships is unthinkable.

Ecology comes from the greece word „oikos", which means household. A household shouldn't spend more money than it has earned. Ecology is the science to keep the house, to keep the house of nature, the house of society and the house of the individual within the related environment. So we have now mentioned the actors of keeping the house or the system of house keeping. Sytems are characterized by relationsships of a special order (**figure 4**). They exists out of material, energy and /or information. Systems have a structured inner world and a kind of enclosure to the outer world. The outer world is connected with this system less than the elements of the inner world. Inspite of that there is an exchange of energy, material and information between the outer world and the inner world of a system.These open systems contain subsystems with special environments.

Fritz Reheis differentiates within the ecosystem „human-earth" the systems earth, society and individual.

The system earth exists out of subsystems such as atmosphere, soil, water, plants, animals and humans. The outer world of the earth is the cosmos, the space. There is an exchange of energy between sun, space and earth. The society belongs to the inner world of the earth. The Earth offers the society the necessary resources and deposition space. The photosynthesis is the beginning of the food chain.

The system society has also an inner and outer world. It gets from the outer world resources and living space. Across the inner border it offers the individual food but also education and security. The other way the individual delivers the society work and/or problems. The exchange between the individual and the society doesn't contain just material but also information, norms, values and attitudes.

The system individual is a subsystem of the system society. Body and spirit belong to the system of the individual and are interconnected. Additionally there is an exchange of energy, material and information between the individual and the society which leads to the socialisation of the individual on one hand and to the development of the society on the other hand.

The result of this thinking in systems is the necessity to think holisticly, i.e. how nature, society and individual are interrelated and how we can keep our house.

Ecological housekeeping means to consume not more than can renew again. Sustainable development means sustainability of nature, economy and society as well **(figure 5).**

Sustainabality of nature means: to consume resources not faster than they can grow again. We have the duty to preserve the resources for the coming generations. The regeneration rate should be higher than the consumption rate. The same is with the emission rate which shouldn't be higher than the assimilation rate.

Sustainability of nature shouldn't exclude the sustainability of the economy. Jobs for all and growing living standards remain important targets. This means for the Third World more comsumption of natural resources and it should mean for the First World new resources-saving technics and particularly new life styles. Of course to reach these objectives is one of the biggest future challenges.

fig. 5 Targets of sustainable development

ecological targets:
Use of renewable resources
Preservation of assimilation capacity
minimal use of nonrenewable resources

economical targets:
growing living standard
high employment rate
price stability
balance of foreign trade

social targets:
equal rights for North and South,
for East and West,
for people in all regions
for all generations

Sustainability of society means equal life chances for all. How we can realize that? Realisticly we should at least try to make sure that the Third World can satisfy its basic needs and that the First World gets strong directives to limit the consumption of nature. But more important than such ecological laws would be the development of new life styles, values and philosophies, which are seen as a new but better well-being than the old one and which replace the quantitave production and consumption by a qualitative better nature, economy and society.
Sustainable development means therefore the combintion of ecological, economical and social sustainability by the development of new production and consumption structures and last but not least by a new ethic through education. Of course also through geographical education.

5. **Action competence of eco-citizens**
In face of the complex and endangered eco-systems and in face of the dysfunctional behaviour of many individuals it is not easy to formulate adaquate ecological education aims. It is even more difficult to transform these aims into action. May be that the concept of the „eco-citizen" can help to reach our objectives.
Eco-citizen means not just an ecologically educated citizen, it also means a politically educated citizen. The concept of the eco-citizen embraces a citizen who is educated in politics, ecology, science, humanities, geography and ethics, i.e who is educated holisticly.
Many surveys have shown that sectoral environmental education is not sufficient to transform knowledge into action. A comitment of all teachers and the entire education system is needed and basic attitudes to nature, creation, life, society, economy and politics are at least as important as ecological knowledge.
But the change of the individual behaviour is not sufficient when not at the same time the governements change the rules and structures. Therefore it is necessary that the eco-citizen is also a political person in order to get new ecological, economical and social rules and developments on the way.
The following list gives an overview on the action-competence of an eco-citizen:

Action Competence of Eco-Citizens

Knowledge

to know basic structures and processes in ecosystems at local, regional and global level

to know the basic ecological, economical and political conditions for future options

Attitudes

to accept sustainability as basis of a new eco-ethic

to accept equality as basis of social and political life

to accept the biological and cultural diversity on Earth

to accept human rights but also earth rights

Ability to solve problems:
to recognize problems
to solve problems
to think of the conseqences of problems and their solutions
Ability to life with risks
to recognize risks
to life with scientific uncertainity
to be carefull
to develop confidence
Ability to life with conflicts
to see conflicts
to analyse the causes of conflicts
to solve peacefully the conflicts between contrary interests
Ability to make decisions
to analyse the reality adaquately
to avoid too fast opinions and consequences
to compare different point of views
to differentiate between short-term and long-term decisions
to find decisions for a Local- or School-Agenda participatoricly and democraticly
Ability to act
according to the knowlede of ecological, economical, social and political structures and potentials,
according to human and earth rights,
according democratic decisions, which are made at school-, local-, national or international level,
according to a new ethic of sustainabiliy
with competence, confidence and solidarity with humans and earth.

References

Agenda 21. Rio de Janeiro 1992
Altner,G. e.a.(ed.) (1997) Jahrbuch Ökologie 1998. München
Evangelische Akademie Bad Boll (1995) Umweltrecht und Ethik. Bad Boll
Convey,A.; Clary,M. e.a.(1998) ENVERS.Towards environmental education in Europe.Brussels
Gross, D. (1995) Grundzüge und Beispiele zukunftsbezogener Umwelterziehung im geographischen Unterricht. In: Arbeitskreis Gymnasium und Wirtschaft e.V.,Sustaianble Development. Unterhaching
Habitat Agenda (1996) Istanbul
Haubrich,H. (1996) Geowissenschaften in Lehrerbildung und Schule. In: Terra Nostra 10
Haubrich, H. (1998) Lokale Agenda 21. In: Haubrich,H.,Geographie hat Zukunft. Seelze
Kaku, Michio (1997) Zukunftsvisionen. München
Kessler, H.(ed.) Ökologische Weltethos im Dialog der Kulturen und Religionen. Darmstadt
Knoke, W. (1996) Kühne neue Welt. Wien
Kopfmüller, J. (1994) Das Leitbild einer global zukunftsfähigen Entwicklung. Karlsruhe
Krol, G.-J. (1995) Sustainability als Herausforderung für die Umweltbildung..In: Arbeitskreis Gymnasium und Wirtschaft e.V. Unterhaching
Meinberg, E. (1995) Homo oecologicus. Darmstadt
Poferl, A. 1995) Determinaten des Weltbewußtseins.. In. Arbeitskreis Gymnasium und Wirtschaft. Unterhaching
Reheis, F. (1996) Die Kreativität der Langsamkeit. Darmstadt

LEARNING TO TEACH ABOUT ENVIRONMENTAL ISSUES IN GEOGRAPHY

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This paper describes aspects of a study into the thinking and practice of student geography teachers in teaching about environmental issues to secondary school students in England. The study links the areas of geographical and environmental education with teacher education.

The paper initially discusses the study's aims and methodology. The research adopted a case study approach, based on the collection and analysis of qualitative data, which were obtained through interviews, structures writing, and classroom observation.

The paper then focuses on the student teachers' thinking at different stages of their PGCE Course. This thinking is explored through dimensions of subject matter and pedagogy which were created through data analysis and show how individual student teachers conceptualised their teaching about a chosen environmental issue. Some of the influences on their thinking, recognised by the student teachers themselves are also described.

The paper concludes with some implications of the study for geography teacher educators and for policy makers more generally.

Key words:

Geographical education
Environmental education
Teacher education
Qualitative research

LEARNING TO TEACH ABOUT ENVIRONMENTAL ISSUES

Graham Corney

1. INTRODUCTION

As a lecturer in geography education, I have had many interesting discussions with student teachers about their selection of appropriate subject matter and ways of teaching. These discussions have shown that student teachers usually have their own beliefs about geography and how it should be taught, and their beliefs are often based on previous experiences. My discussions reflect research in teacher education which suggests that student teachers generally begin their courses with pre-conceptions of their subject and ways of teaching it, and these form a major influence on their thinking and classroom practice during their course and early years of teaching (for example, Zeichner, Tabachnick and Densmore 1987, Feiman-Nemser et al 1989, Grossman, Wilson and Shulman 1989, Calderhead and Robson 1990).

There is, however, very little research which focuses on geography student teachers. Walford (1996) and Barrett Hacking (1996) have shown that geography student teachers begin their courses with subject 'stances' or 'persuasions'; Barrett Hacking has suggested that they possibly 'suspend' these in early school experience through the influence of the school syllabus or National Curriculum; Leat (1996) has described 'images' of teaching held by geography student teachers at the start of their course.

Some of my most interesting discussions have been about the teaching of environmental topics, and, in the absence of research, it can be suggested that this area of geography reveals particularly well teachers' differing conceptions of subject matter and teaching. This suggestion is based on the argument that environmental subject matter is complex, integrating human and physical systems (Johnston 1989, Posch 1993), and controversial, involving study of different viewpoints and perspectives (DES 1986, Marsden 1995), thereby allowing differing interpretations of subject matter. Similarly, it is increasingly argued that teaching environmental topics should reflect 'problem-solving and enquiry-based learning' which encourage pupils to become 'actively involved in environmental management' (Tilbury 1997: 108), although it is recognised that individuals may choose a less interactive approach.

The study on which this paper is based was, therefore, undertaken in the context of limited research with geography student teachers' in general and the area of teaching environmental topics in particular. It aimed to investigate how geography student teachers think about teaching environmental topics at the start and later in their teacher education course, to illustrate examples of their classroom practice, and to identify, especially from their own perspective, what guided their thinking.

The paper focuses on selected aspects of the thinking of three student teachers, Phil, Tracy and Nick. This is preceded by a short description of the methodology adopted and followed by some implications for geography teacher educators.

2. METHODOLOGY

A case study approach was adopted to allow an in-depth study of key issues in teaching environmental topics in geography. The research exemplified an 'instrumental' or 'collective' case study (Stake 1995:3-4). It was characterised by interpretive and ideographic enquiry, and a naturalistic research plan (Anderson and Burns 1989:81). In addition, as with much case study research, it employed qualitative rather than quantitative methods.
The main techniques for data collection and analysis can be summarised as follows:
(i) at the start of the course a structured writing exercise was completed to obtain information on teaching environmental topics; it included questions about the content and teaching approach which might be adopted by the respondent in teaching an environmental topic of their choice; it was followed by a semi-structured interview;

(ii) immediately before the student teachers' main school experience, and at the end of the course, these techniques were repeated to allow comparisons;

(iii) during school experience, a sequence of pre-lesson interviews, lesson observation, and post-lesson interviews was carried out to provide a vignette of practice and thinking in the school context to supplement the decontextualised data;

(iv) data was initially analysed by individuals to produce a vignette or 'rich description' (Stake 1995) for each student teacher at successive stages in the course; this involved familiarisation of interview transcripts, written answers and observation notes, followed by data reduction to identify key themes (Miles and Huberman 1994);

(v) a second stage of analysis involved cross-case inspection of the themes and the data itself to identify 'dimensions' which reflected the thinking and practice in teaching about environmental topics by these geography student teachers.

3. THINKING ABOUT TEACHING ENVIRONMENTAL TOPICS

Three examples of the dimensions identified from the data reflecting student teachers' thinking are discussed, together with some influences which guided their thinking.

3.1 At the start of the year

One dimension related to broad conceptions of geography. Phil and Tracy held almost identical beliefs which seemed to reflect the people-environment paradigm. For Phil, geography was 'the study of how the environment shapes human activity and also how human activity shapes the environment'; Tracy's definition gave 'equal weight to nature and humanity and the inter-relationships between them'. In contrast, Nick seemed to reflect a more systems-based, spatial and scientific interpretation, and he expressed the relationship between people and environment in terms of how people 'react to these system restraints'.

Another dimension related to more specific subject conceptions. This was based on their choice of environmental topic for teaching A-level and GCSE students and the

way in which their selected concepts reflected a more topic, neutral-based or a more problem and issues-based view of geography. Nick's choices reflected a more topic based view while those of Phil and Tracy reflected an issues-based interpretation.

Thus Nick chose 'coastlines', and his concepts were expressed mainly as physical geography processes and features. Examples include 'factors of coastal evolution' and 'processes occurring on the beach'. He also justified a sequence for A-level students in terms of the first as 'the base' for other concepts, the second as exploring processes in detail, the third as 'more complex', and the fourth because it 'rounds off the subject'.

In contrast, Phil chose 'river basin management', partly because 'it showed how people affect and are affected by the environment' and Tracy chose 'global climate change', because it was 'likely to have a profound effect on everyone's lives'. Phil's concepts were expressed as inter-relationships between human activities and 'problems', for example 'how industrial and agricultural activity can affect the quality of the water'. He explained that this showed how people could 'damage the environment' and this understanding would lead to 'an appreciation of less damaging activities'. Tracy expressed her concepts in a similar way, including the concept that 'humanity, due to industrialisation, has increasingly acquired the ability to affect the climate system'. Furthermore, she explained her sequencing as based on the causes of global climate change, a detailed understanding of processes, and the human impact in terms of 'the effects' which were 'varied and depend on an individual and society's position'.

A third dimension related to pedagogy. This was based on the rationale for their teaching strategies and the way in which it reflected beliefs about subject matter or pupils learning. Phil and Nick described very similar approaches, based on fieldwork and follow-up classwork, although Phil described more teacher directed field activities and pupil centred project work while Nick described project work throughout. Both student teachers emphasised the value of fieldwork for pupil learning, although Phil saw this as providing a 'concrete', visual' and 'less abstract' learning experience which 'remains in the memory much longer' while Nick's rationale was more generally expressed in terms of 'pupil interest'. Tracy described three activities which she justified as providing variety so pupils 'don't get bored'. Although they were teacher directed, they took pupils' 'own situation' into account, and her approach involved 'breaking up the topic' so that pupils 'could understand the complex cause and effect relationship' associated with global climate change.

In relation to prior experiences, Tracy began her course immediately after graduating while Phil and Nick spent two years travelling, respectively working in Australia and teaching English in Japan. All three referred to their secondary school and undergraduate experiences as guiding their thinking, and Phil referred to travelling. It seems that their conceptions of geography related to their own A-level courses, which for Phil and Tracy were based on the Geography 16-19 Project with its people-environment approach, while for Nick it was a more topic-based, less integrated course. Furthermore, these A level interpretations of geography seem to have been re-inforced in their university courses both through core units and especially their chosen options. In relation to pedagogy, both Phil and Nick explicitly stated the influence of GCSE field courses related to their chosen environmental topic, while

Tracy described a GCSE teacher who she 'really admired' and who used 'a variety of methods'. Finally, Phil described how travel had reinforced his people-environment conception of geography because he 'wasn't really environmentally conscious' when he graduated 'but started to think a lot more' when he began travelling.

3.2 Later in the year

In relation to broad conceptions of geography, Phil and Tracy maintained their beliefs in the people-environment paradigm while Nick's thinking changed. His previous conception in which people were restrained by various systems was replaced by one in which people were ' affected by and affect their locality'. He thought there seemed to be 'more issues in geography' than when he had studied it, and stated his surprise when he discovered that 'even in physical geography, they try to relate it to people, hence normally there's an issue there'. He explained that for school geography, the balance (should) outweigh the parts' whereas at university level, the emphasis should be on 'the individual components' which outweighed 'how they link together'. It can be suggested that his earlier conception represented his view of university geography and his conception changed through his teacher education experience.

Related to their more specific conceptions of subject matter as reflected in their choice of environmental topics and concepts for teaching, Phil and Tracy again maintained their issue-based beliefs while Nick changed significantly towards this interpretation and away from his previous topic based approach. Both Phil and Tracy described and justified their interpretation in more detail than earlier in the year; for example, Phil explained that his teaching of river basin management adopted 'a holistic approach' based on systems, which helped pupils understand 'how all the elements of the environment influence each other and also how people ... can have an unbalancing effect'; Tracy explained that to understand 'the whole picture' about global climate change it was necessary to study political, economic and cultural factors and 'alternative courses of action'. Nick provided compelling evidence of his change to a more issues-based interpretation. He changed the title of his unit to 'Coastal protection: do you/ should you protect a coastline or allow nature to take its course?', and his third concept became: 'the issue: should we attempt to stop nature?'.

In the pedagogical dimension, all student teachers showed some degree of change in that their chosen strategies became more interactive and less teacher directed. Tracy continued to describe a variety of activities with her increased emphasis on pupil centred tasks, including a suggested role play in which groups would create their own 'plan of action' to cope with global warming. Phil retained fieldwork but replaced the class based project work with 'problem solving exercises' in which pupils would 'offer solutions' to river basin 'management problems'. Nick again showed the greatest change. He retained local fieldwork but added a case study of erosion in Holderness using a video, and proposed a 'debate or role play' for pupils to investigate coastal management. However, in justifying their pedagogy, while Phil and Nick continued to stress the value of fieldwork and particular strategies, Tracy showed a fundamental change in her conception. She stated explicitly that her approach was 'related to the enquiry process' and she described how her initial teaching activities would 'whet (pupils') appetite', subsequent activities would help them understand 'the vital geography', and her last group of activities would 'really test their understanding'.

Finally, the student teachers spoke about a variety of influences which guided their thinking at the end of the year. As influences on their conceptions of geography and their specified environmental topic, Phil identified prior experiences, noting 'combined experience of school, university, general reading and travelling'; Tracy stated that her undergraduate course was most important although she 'had been thinking about geography in a different way' and considering pupil perspectives during the year; Nick identified course experiences and referred to university work on the National Curriculum, discussions with his mentor about 'current approaches' in geography, and his own teaching including a unit on coastlines.

As influences on their pedagogy, all referred to their own teaching. In addition, Phil referred again to prior experiences, especially secondary school, but also to the course, especially university sessions which had given him 'ideas' such as 'role play' and using 'a local issue' to help pupil learning. Nick referred to university sessions, in particular one on pupil learning styles. Tracy referred again to her GCSE teacher's use of variety, to university sessions on pupil learning styles and on theories of pupil learning and the enquiry process, and to seeing her mentor teach lessons using the enquiry process about a controversial proposal to build a reservoir near his school.

It appears, therefore, that at the start of the year, the student teachers had clear pre-conceptions of geography and of teaching a specific topic, although the former were more detailed than the latter. Furthermore, all linked their pre-conceptions to prior experiences, especially secondary school and undergraduate experiences, with Phil including the influence of travel. Later in the year, their conceptions of geography showed varying degrees of change with a convergence on the people-environment paradigm and an issues-based interpretation. Their conceptions of pedagogy showed greater detail, continued to reflect both subject and pupil based beliefs about teaching, and in the case of Tracy, showed an understanding of overall theories of pupil learning. In addition, the influence of prior experiences remained strong although there was evidence of the influence of various course experiences including their own teaching, university sessions, and observing a mentor's teaching.

4. SOME IMPLICATIONS FOR GEOGRAPHY TEACHER EDUCATORS

Given the clarity, strength and differing nature of pre-conceptions, together with the individual ways in which both prior and course experiences seem to influence these student teachers, there seem to be important implications for course planning. It is suggested that teacher educators provide opportunities for student teachers to make their pre-conceptions explicit, so that student teachers are more fully aware of their pre-conceptions and of how these 'constitute a lens (Feiman-Nemser et al 1989:1) through which they themselves view their course. Furthermore, with a more explicit recognition of these preconceptions, tutors and school mentors can more readily adapt the teacher education curriculum to suit individuals. Tutors and mentors should also provide continuing opportunities for student teachers to reflect about their course experiences.

While these points apply generally to the geography teacher education programme, they have special importance to teaching environmental topics. This relates partly to

the difficult decisions about subject matter and pedagogy attached to this area of the geography curriculum and also to the fact that, at least in the English context, geography teachers provide a major contribution to their pupil's environmental education. The nature of this contribution is likely to reflect an individual teacher's conceptions of subject matter and pedagogy, which, in turn, have been influenced by differing experiences and in different ways.

REFERENCES

Barrett Hacking, E. (1996) Novice teachers and their geographical persuasions, *International Research in Geographical and Environmental Education, 5 (1): 77- 86.*

Calderhead, J. and Robson, M. (1990) Images of teaching: student teachers' early conceptions of classroom practice, *Teaching and Teacher Education, 7 (1): 1-8.*

DES (Department of Education and Science) (1986) *Geography from 5 to 16.* Curriculum Matters 7. London, HMSO.

Feiman-Nemser, S., McDiarmid, G. W., Melnic, S. and Parker, M. (1989) *Changing Beginning Teachers' Conceptions: a Description of an Introductory Teacher Education Course.* Research Report 89.1. East Lansing, MI: National Centre for Research on Teacher Learning, Michigan State University.

Grossman, P. L., Wilson, S. M., and Shulman, L. S. (1989) Teachers of substance: subject matter knowledge for teaching, in Reynolds, M. C. (ed) *Knowledge Base for the Beginning Teacher, 23-36.* Washington, DC: American Association of Colleges for Teacher Education.

Johnston, R. J. (1989) *Environmental Problems: Nature, Economy and State.* London, Belhaven.

Leat, D. (1996) Geography student teachers and their images of teaching, *International Research in Geographical and Environmental Education, 5, (1): 63-68.*

Marsden, B. (1995) *Geography 11 - 16.* London, David Fulton.

Miles, M. B. and Huberman, A. M. (1994) *Qualitative Data Analysis.* Thousand Oaks, CA, Sage.

Posch, P. (1993) Research issues in environmental education, *Studies in Science Education, 21:21 - 48.*

Stake, R. (1995) *The Art of Case Study Research.* Thousand Oaks, CA, Sage.

Tilbury, D. (1997) Environmental education and development education: teaching geography for a sustainable world, in Tilbury, D. and Williams, M. (eds.) *Teaching and Learning Geography, 105-116.* London, Routledge.

Walford, R. (1996) 'What is geography?': an analysis of definitions provided by prospective teachers of the subject, *International Research in Geographical and Environmental Education, 5 (1): 69-76.*

Zeichner, K. M., Tabachnick, B. R., and Densmore, K. (1987) Individual, institutional and cultural influences on the development of teachers' craft knowledge, in Calderhead, J. (ed) *Exploring Teachers' Thinking, 21 - 59.* London, Cassell.

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THROUGH WHOSE EYES? CONFRONTING THE ENVIRONMENTAL DILEMMA IN GEOGRAPHICAL EDUCATION

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The moral high ground environmental educators claim is weighed up against the fact that 'environment' as a concept is a social construct (de Chiro) and therefore culturally, rather than universally contextualised. This paper explores the dilemma this poses for geography education on two levels. The first of which is associated with geography's traditionally accepted role in developing 'a sense of place', while the second is related to increasing pressures from the environmental lobby for geography, as an environmental discipline, to 'stand up and be counted; in the face of the 'environmental crisis'.

In posing the question: 'Through whose eyes?', the paper begins by identifying issues that have to be confronted by geography educators in multicultural societies. School geographies for southern African countries have been, and continue to be accused of presenting a eurocentric view of place that has little relevance to the cultural realities of the learners. If the tenets underpinning current approaches to environmental education are to be incorporated into geography education do we face a very real danger of exacerbating a situation where geography is frequently perceived simply as 'book learning'? Or, does environmental education provide geography with a means to contextualise the discipline for learners from within their particular cultural frame of reference (Bruner 1996)?

Drawing on experiences from within the SADC (Southern African Development Commission) countries, this paper further considers possible approaches for environmental education in a multicultural school geography.

THROUGH WHOSE EYES? CONFRONTING THE ENVIRONMENTAL DILEMMA IN GEOGRAPHICAL EDUCATION

Ursula van Harmelen

INTRODUCTION

There is no such thing as environmental education. What does exist is a range of responses to the environmental crisis. Each of which is located in a particular theoretical position informing a specific practice. The diversity of responses creates a dilemma when considering the nature and point of environmental education in and for geographical education, particularly from within the perspective of formal school geography in multicultural societies. The case study referred to in the paper reveals the issue of environmental education in such societies as being more of a political and socio-economic issue than an academic one. My intention in the allotted space is to encourage debate rather than to provide a neat set of solutions through my eyes.

THE ENVIRONMENT: THROUGH THE EYES OF RURAL SOUTHERN AFRICA

The case study referred to is part of a series of studies focusing on rural development in the former 'homelands' of the Eastern Cape. Aspects that have initiated the research include land disputes, conflicts between communities and nature conservation and the need to address poverty and underdevelopment. The studies are environmental in that their concern is the impact made on the biophysical resource base by political, economic and social decisions of the past.

This study is located along a section of the coast in the former homeland of Transkei and constitutes eight villages bordering a unique coastal forest reserve. The research was initiated as a result of a conflict situation arising from the perceived 'hands off' policy of the then conservation body. The situation at the time of the research was made more volatile by a land claim focusing on the reserve area. One of the dimensions that was seen as pertinent to the resolution of the conflict was the need to identify 'appropriate' environmental education programmes for the communities(van Harmelen 1997).

The region, situated in one of the most scenically spectacular regions of the country is lush, well watered by large perennial rivers with rich soils and a climate that is ideally suited to the growing of a range of vegetables and subtropical fruits. The magnificent coastline is a fisherman's paradise Yet ....

* From the main road to the coast takes a minimum of three hours to travel 90 kilometres. Not surprisingly there is no form of public transport to the area, there is no telephone system and no electricity. Consequently the opportunities for trading with the larger inland towns and for tourism are severely hampered by the lack of communication networks.

* The villagers are primarily dependent on subsistence farming. Maize and beans are the only crops cultivated with varied success on garden plots of 50 square metres allocated to each household. Other than cabbages and the odd carrots no other vegetables or fruits are cultivated. Malnutrition is endemic among both adults and children. When investigated it transpired that one meal a day was seen as "good", but often that meal consisted of a gruel of water and maize meal.

The reasons given for the lack of variety in this area of crop types included:
" # those foods are not part of our culture;
trees around a house are dangerous, you cannot see your enemies coming."

Livestock, particularly cattle are highly valued but few households in reality own cattle. Milk is a luxury only available when a cow has calved. A dairy project was initiated by a returning exile, but abandoned "because they [the villagers] forgot to collect the cows from the veld and did not see to it that they were given enough green feed". While shellfish is collected by the women there is no tradition of fishing in the villages and the population pressure on the coast has led to the stripping of marine life from the rocky shore except in the reserve.

* At the time of the research there were no water supply points in any of the villages. Water is collected and carried by the women and children (in some cases this involved a round trip of three to four hours). Most schools in the village have no water available for the learners as the schools are either thatched huts or have no gutters to collect rain water.

* There was only one clinic serving all eight villages, with the nearest hospital some 90 km from the area. The three nurses staffing the clinic have no transport, no phone, no refrigeration facilities for vaccines, and at the time of visiting had run out of all drugs except aspirin.

* Schooling in the villages is a relatively haphazard affair that happens when it happens. By and large the only contact with the authorities is via the district circuit office. School inspectors, health visitors or any other outside agency is either forbidden the area or simply cannot reach it. Resources are limited to the odd text books and a chalk board which is used for as long as the chalk supply lasts.

This essentially conservative community lives at best a sort of hand to mouth existence by any western standards yet the little cash that is available through migrant labour and old age pensions is used to acquire typically western commodities. Our hosts in one of the villages put us up in the rondavel kept for the use of the parents and it was furnished in the same way that any modest western master bedroom would be equipped. Dress and artifacts are largely 'western' and this reflects the tension between tradition and the aspiration for the material benefits of western technology.

THE SEARCH FOR AN APPROPRIATE ENVIRONMENTAL EDUCATION FOCUS

These few extracts from the research could be dismissed as reflecting a society totally at variance with the western world. Yet, these communities are as much a part of the South African society as that of metropolitan Johannesburg or sophisticated, cosmopolitan Cape Town. The learners in this area all follow the same school curricula, have the same text books, write the same examinations and have the same aspirations for a 'better life in a better world' as that of their counterparts in the 'first world' communities of South Africa.

Through whose eyes are we then to reflect the environment in our geography texts?

* Should we focus on conservation in a country where there are huge disparities in terms of access to even the basic life supporting resources? Yet at the same time these resources are under such severe pressure that there is considerable concern that they will be able to be supplied beyond the very near future. The threat to our incredible bio-diversity by development projects

of one sort or another is enormous.

* Sustainable development(Huckle 1990)taking as it did a broadly social view of the environmental crisis provided a 'politically correct' vision for development. Yet this approach has increasingly been criticised by the experts and not least by members of the communities in the case study referred to. Their position was: "What is this thing sustainability, who decides what is sustainable and sustainable for whom?" "Who will benefit from the big commercial developments that are planned along our coast." "We will just lose what little we have in exchange for unskilled, badly paid jobs."

* The philosophy and practise of sustainable living suggests we live 'lightly on the land' avoiding unnecessary consumerism, while focusing our efforts on recycling and re-use of commodities(Fien 1993a, 1993b, Huckle, 1990). How much more lightly can we expect a people to live who are struggling to survive, who are lucky if they have access to more than 25 litres of water a day? Certainly this response to the environmental crisis makes a great deal of sense in affluent and wasteful communities, but how is this to be presented in centralised curricula that universally used texts?

* Ecological sustainability is yet another response to the environmental crisis that has considerable appeal (Keen, Dearn and Harris, 1990). Is it, however, essentially any different from approaches that strive for better management of resources, albeit through emphasising the need to educate for an understanding of the interrelated, integrated and interdependent nature of all dimensions of the environment? This approach yet again begs the question of who will make the final decisions and who or what will benefit. Is it possible in geography education to provide a politically as well as a socio-economically satisfactory solution to this problem?

* Earth Love and similar responses too have their appeal, but can we convince a people who do respect and love the land to stop 'raping' it because they are forced through circumstances to place a primarily utilitarian value on the land and its resources?

* Is it perhaps the deep ecologists who have the answer?

* Should we rather take a view that suggests an issues based enquiry approach to finding solutions to local environmental problems and issues, in the hopes that learners and communities through taking action on a local level will attend to environmental problems on a national and perhaps even global level.

* Should the so called 'scientific' view that opts for a clinical and antiseptic analysis of the environment and its many components be retained?. This approach dominates in currently used geography texts in southern Africa, in spite of being seen as 'eurocentric and irrelevant' and criticised as being simply a cop out(van Harmelen and Irwin, 1995) .

The contested nature of knowledge is well illustrated in the diverse responses to environmental problems and issues. Post-modern thinking suggests that knowledge ought to be contextualised and situation specific. Yet how will this be achieved in the multicultural and multi-dimensional societies where policy is centralised and operates on a national basis? Where school curricula are developed within a single central strand. Where the competition for 'white collar' jobs leads to an examination driven and textbook dependent education system. A situation that is exacerbated by school-leaving examinations that are set and administered by outside agencies.

In affluent societies the problem is considerably alleviated by being able to either choose the materials or resources that are deemed appropriate for a particular situation or by being able to present a variety of positions through the use of diverse texts. This is not an option for most of the southern African countries.

In countries such as South Africa and Namibia there is no shortage of 'environmental education' resources that have been developed by private initiatives. While many of these resources are excellent and provide a broad spectrum of theoretical positions, because they are not 'prescribed' texts that can be purchased through textbook allocations, such as thy are, their access is limited.

In South Africa the new education dispensation advocates that teachers develop their own learning programmes and resources, admirable though this may be, in the short and medium term this remains a chimera for a variety of reasons.

RESPONDING TO THE ENVIRONMENTAL CRISIS THROUGH GEOGRAPHICAL EDUCATION

Knowledge is not neutral and the stance taken by each geographical text and each geography educator will be a reflection of the individual 'world views' held. What then are the possibilities for environmental education in and for geography in the formal education system of multicultural societies? Given the fact that we are first and foremostly considering environmental education from within the CONTEXT of geography, and whatever else geography attempts to achieve in formal schooling its role is to aid the learner's development of a sense of place in a space-time frame.

That geography must respond to the environmental crisis as an integral dimension of our current space-time frame is obvious. The diverse theoretical positions would seem to make the issue of what this response is to be a matter of academic choice. In the southern African context, and elsewhere, the fact is that environment and the environmental crisis is identified primarily as a political and a socio-economic issue. If geographical education is to make a meaningful contribution to resolving the crisis, I suggest it will have to move beyond teaching 'better ecology better', or providing better recipes for fieldwork.

The concern expressed by the Namibian Minister of Higher Education in a recent interview (van Harmelen, 1998) mirrors the concerns of the villagers with whom I had contact in the case study referred to. A concern which the minister articulated as: "We do not want an environmental education that is a list of 'do nots', we want an environmental education that helps us to find solutions and viable alternatives to the problems and issues we face" (van Harmelen, 1998)

As both a geography educator and environmental education provider, I consider this to be the real challenge we face in terms of taking an environmental approach in and for geography education.

REFERENCES

Fien, J. (1993a) Education for sustainable living: An international perspective on environmental education. *Southern African Journal of Environmental Education* . 1993:7-19.

Fien, J. (1993b) *Education for the environment: Critical curriculum theorising and environmental education.* Geelong: Deakin University.

Huckle, J. (1990) Education for sustainability: assessing pathways to the future. *Conference proceedings, Our Common Future.* Adelaide: Australia.

Keen, M, Dearn. J. & harris, J. (1990) Educating for ecological sustainability. *Conference proceedings, Our common future.* Adelaide: Australia.

van Harmelen, U. & Irwin, P.(1995) Challenging geography: A South African perspective. *Geographical Education 8(3):35-39.*

van Harmelen, U. (1997) The scope for environmental education, in Palmer,R.(ed). Indigenous knowledge, conservation reform, natural resource management and rural development in the Dwese and Cwebe Nature Reserves and neighbouring village settlements. The first phase of the research. Grahamstown: Rhodes University.

van Harmelen, U. (1998) Enviroteach Phase Two, a sida sponsored programme of the MBEC implemented through the DRFN: Evaluation report. Grahamstown: Rhodes University.

HOW DOES THE GEOGRAPHY TEACHER CONTRIBUTE TO PUPILS' ENVIRONMENTAL EDUCATION?

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The paper is based on a recently completed doctoral study at the Centre for Research in Education and Environment at the University of Bath. The focus of the study was the contribution of geography teaching to pupils' environmental education, particularly through the study of local issues. The study investigated three areas: (i) geography teachers' conceptualisations of environmental education; (ii) how environmental education provision is affected by the disposition of schools and the practices found within them; and (iii) the dynamics of improving the contribution of geography teaching to pupils' environmental education when pupils study local issues.

The study drew on research in environmental education, geography education and teachers' thinking. The methodology was primarily qualitative in approach, and was based on ten cases of secondary school geography teachers from the UK who participated in a series of interviews and tasks to elicit their thinking and practice in this area. The main findings, to be discussed further in the presentation, relate to how geography teachers can contribute less or more to pupils' environmental education, and how they might develop this contribution.

HOW DOES THE GEOGRAPHY TEACHER CONTRIBUTE TO PUPILS' ENVIRONMENTAL EDUCATION?

Alan Reid

INTRODUCTION

The doctoral project reported here used a variety of theoretical frameworks to investigate environmental education (EE) within comprehensive secondary schools in England, and in particular, the theoretical, ideological and practical factors which influence the final provision of EE by geography teachers. The core of the study considered how ten geography teachers make sense of their professional world, the knowledge and beliefs they bring with them to the task of contributing to pupils' EE, and, more generally, how teachers' understanding of learning and the subject matter inform their practice when contributing to pupils' EE, particularly through the study of local issues (cf. Calderhead, 1996). The study set out to interpret qualitative data regarding these phenomena as a basis for theorising *about* and *with* the data. Capturing data of this kind was particularly suited to exploring and understanding the participants' meanings, attributions of cause and consequence, and the 'local groundings' for the phenomena under investigation, each from the participant's, and not just the analyst's, perspective. Research procedures were flexible rather than pre-determined, with questions and instruments being developed reflexively as the study phases iterated and progressed.

BACKGROUND

The factors affecting the provision of EE by geography teachers are complex. They may include, amongst other things, the knowledge and understanding, awareness, enthusiasm and the practices of the teacher. Therefore this study drew heavily on research in teachers' thinking, particularly that about teachers' beliefs and knowledge (e.g. Clandinin, 1986). In addition, and within the scope of this study, it was important to consider a school's ethos and factors relating to the realisation of policy. Therefore, context, planning and the co-ordination for implementing EE within the school were also investigated (cf. Tilbury, 1994).

Three key themes that were presented, evaluated, and re-conceptualised in the thesis (Reid, 1998) were: EE, EE within school geography, and the study of local issues. As described in the abstract, the study explored these themes in relation to the primary research question, *how does the geography teacher contribute to pupils' EE through the study of local issues?* The project drew upon a variety of traditions in educational research to focus the various research questions, and combined distinctive research methodologies involving the collection of qualitative and quantitative data through a multi-methods approach. While interpretive studies are not limited solely to the use of qualitative methods, such methods are most typically used, and were adopted throughout the bulk of this study.

The project, in adopting a multi-methods approach, reflected a pragmatic rather than a purist review of research design: the selection of methods was guided by securing an understanding of the problem rather than being rigorously determined by a choice of paradigm, piecing together those techniques that seemed to enable the researcher to better tackle the specific research problem (see Shulman, 1981). This can be likened to an 'honest eclecticism', that is, it deliberately and openly borrowed certain aspects of other theories and approaches and adapted them for its own purposes (see Layder, 1994). Although, as Robottom and Hart

(1993) would argue, epistemological, methodological and ontological differences might be problematic in this approach to research, they are not taken to be irrevocable since: (i) the orientations have not been drawn upon in an arbitrary, haphazard or opportunistic way, but reflect rigorous and reasoned choices (see Reid, 1998), and (ii) the orientations are not conceived as representing mutually antagonistic ideal types of research traditions involved in some kind of 'paradigm war' (see Mrazek, 1993). Rather, they were treated as ingredients in a co-operative and critical dialogue for empirical research design and analysis, although, it is acknowledged, between sometimes apparently antithetical strands of thought (cf. Robottom & Hart, 1993; Reid, Scott & Oulton, 1997; Reid, 1998).

The research took place through three distinct phases that progressively focused and developed the study. The first phase involved a literature review on aspects of geography teaching, EE and the study of local issues, and this was followed by a survey using a Likert-type questionnaire for a predominantly locally-based, convenience sample of eighty secondary school geography teachers on these same themes. A follow-up, semi-structured interview followed dimensional and opportunistic sampling to generate a cohort of ten cases. This first interview used a variety of tasks to elicit teachers' thinking about EE; the relationship between geography and EE; and how a variety of scenarios from geography teaching might contribute more or less to pupils' EE (Reid, Scott & Oulton, 1997). A second interview with each teacher a school term later was based around a discussion of the teacher's autobiographical account of aspects of the context for their geography teaching, forming the second data collection phase of the research (Reid, 1998). The final phase involved detailed investigations of how three of these teachers espouse and practice improving the contribution of their geography teaching to pupils' EE through the study of local issues. In contrast to earlier phases, the third one appropriated aspects of problem-based methodology (Robinson, 1993) to structure the data collection and to assist the data analysis.

The data collection and analytical outcomes of each phase focused on the teachers' accounts of the contribution that their geography teaching makes to pupils' EE, as well as how they might improve the contribution of geography teaching to pupils' EE. Illustrative foci include: (i) teaching and learning strategies appropriate for EE when studying local issues, (ii) the relationship between geography and EE, and (iii) the constraining and enabling factors which determine whether a contribution to pupils' EE takes place. These foci are exemplified and discussed at length in Reid (1998), while the following section introduces and problematizes the theorising of categories for the geography teacher's contribution to pupils' EE.

THEORISING *ABOUT* AND *WITH* DATA

As Coffey and Atkinson (1996:191) suggest, data are not just a fixed corpus of materials on which procedures of analysis are performed, they are something that might be 'thought about and thought with'. In the remainder of this paper, I problematize examples of my theorising within my doctoral project. Briefly, the thesis concluded by reflecting on the nature and practice of EE at a more general level than recounted in the case studies. My theorising transformed the qualitative data from the study in an attempt to account both comprehensively and systematically for how particular aspects of contributions to pupils' EE might be re-conceptualised. The case studies, of course, form a supporting archive of the instances, vignettes and scenarios the teachers and I discussed. The main findings in the thesis related to the ways that the ten geography teachers in the interview phases of the study contributed less or more to pupils' EE, and how they might develop this contribution. They were illustrated by:

- an analysis of the disjunctures identified between 'official' rhetorics of EE and the thinking and practice of geography teachers, based on accounts of studying local issues;
- a discussion of the strengths and weaknesses of three ways of categorising contributions to pupils' EE through geography teaching; and
- a commentary on a variety of issues identified in these geography teachers' accounts of their contribution to pupils' EE, focusing on accounts of provision and policies for EE within a subject-based curriculum and as a cross-curricular theme.

Problematizing the second of these points forms the focus of the rest of this paper.

Possibilities for categorising contributions to pupils' environmental education

What is clear across the teachers' case data was that they took many different approaches in contributing to pupils' EE. These approaches might of course be categorised in a variety of ways. In my thesis I infer three 'types' of approach within the geography teachers' accounts for this study: the *pluralist*, *exclusivist* and *inclusivist*. They were idealised across the particular instances of lessons that contribute to pupils' EE. This categorisation functioned as a 'builder of discourse' through its explanatory value. It was presented as an heuristic only, and with the acknowledgement that no set of categories is completely adequate in analysing and dealing with the complexities of the research themes and lessons investigated with my research question. The depiction of possible ways of configuring these relations was not to be exhaustive of all possible geography lessons, yet it did set out to be representative of the range of accounts of actual lessons and scenarios in the project and the categories to which they could be associated. There were, of course, considerable differences between the activities represented by contributions belonging to the same 'family' of approach, as well as many features of overlap between different approaches (see Reid, 1998, for exemplification).

In common, unifying each category was the nature of the response to the analytical question, 'What is distinctive about geography's contribution to this aspect of pupil learning?'. The broad 'family resemblances' ascribed to the data were labelled as instances of one of three categories that might typify 'modes' of teacher's thinking. They tended to reflect elements of approaches that were either, in distinction or combination:

pluralist - that all educational activities, whether they be formalised as subjects or not, are equal and valid paths to the goals of EE, and geography is but one configuration of a 'vehicle' amongst many equally important 'vehicles' that are capable of contributing to pupils' EE;

exclusivist - that only geography, or a select few other subjects such as biology and environmental science, contribute to pupils' EE (often through specific means (i.e. subjects), with limited goals, e.g. developing pupils' environmental knowledge in geography rather than, say, facilitating pupil involvement in the resolution of local issues);

inclusivist - that geography is of paramount importance in contributing to pupils' EE, although contributions, whether geographical or not, may be derived from other educational activities or subjects, whether they are, say, primarily 'about', 'in', or 'for' the environment in focus, theory and/or practice.

Clearly, various presuppositions undergirded each category. They revolved around attributed emphases in subject definitions and curriculum organisation, and were also related to environmental ideologies, geographical traditions and perspectives. In what follows, rather than illustrating more fully the features of these approaches and objections to them (see Reid, 1998), I focus on difficulties with the analytical task itself.

Difficulties with the categorisation

As with any such categorisation of approaches for contributions to pupils' EE, some might want to advance further approaches or refine or extend the features of the categorisation (ibid.). Furthermore, others might find this categorisation unhelpful or even question the categorical project altogether. Challenges to the whole enterprise can be forcefully put forward via critiques from poststructuralist and postmodernist perspectives, and it is to examples of these that this paper now turns. As will be seen, such critiques might react primarily to the pluralist category, but they might also find problems with the purposes and practices of categorisation itself, particularly when seen to be associated with 'absolutist', 'totalising' and 'exclusionary' intentions.

A poststructuralist critique may follow Foucault's lead and criticise the categorisation both politically and genealogically. It could be argued that rather than producing theories about contributions to pupils' EE in an abstract, a-historical and a-political fashion, attention should be paid to the social, the political, and to power (in terms of the discourses and relationships between teachers, subjects and pupils, in their particular localities). Thus an investigation such as this might better be used to 'validate' local knowledge about local circumstances, removing 'blindness' to both particular and/or attributed characteristics and the asymmetries of power. Also, EE research has often served to obscure rather than identify the 'real terrain' where the key to understanding contributions to pupils' EE is the exercise of pedagogical power in socio-cultural particularities, as constituted by geography lessons. Thus it might be argued that pluralist approaches in EE (which might often be associated with a 'liberal agenda' for education) perpetuate the existing *status quo* by distracting attention away from the 'real problems' identified by a poststructuralist agenda, such that conflict rather than consensus would be more visible, and the workings of power and privilege not ignored.

Despite the apparent force and incisiveness of this critique, there is a danger that some poststructuralist insights redescribe the study's territory so radically that there are no longer any other 'valid' EE research questions left. While such a critique may be seen as powerful in identifying spurious categorisations, it may be argued that it can lead to and surrender questions about geography teaching to those of social and political theorists, thus 'reducing' all questions of pedagogy to a much less differentiated set of questions about power, pedagogy and knowledge (resistance, contestation, subversion, etc.), and/or genealogical origins for EE and geography. Of course, a lamentable series of consequences would be that the enactive, differential and relational aspects of teachers' 'living theories' become increasingly marginalised to the priorities and dictates of a body of critical theory.

Another criticism, while sharing much in common with poststructuralist insights, proposes quite a different role for education. A conservative form of postmodernist critique is one of many that would be deeply suspicious of the notion of 'contributing to pupils' EE', as well as the proposition that teaching, and geography teaching in particular, can provide a basis for achieving a more sustainable future. Although the pedagogical discourses are 'genetically' linked at a variety of levels, they should be recognised as standing as contradictions to each other: for example, despite the persuasiveness of discourses on 'education for sustainability', they are at root based in an oxymoron, the construction of which is embedded in particular, as opposed to universal, and contesting as opposed to uncontested, cultural-linguistic practices. Of course, these arguments might also be applied to school geography. In light of this, the critique can be read as suggesting that geography teachers must simply teach 'geography' through its own particular forms of practice within the school curriculum, and that they need

neither accommodate nor adapt to the demands of other pedagogical discourses. Although this may be seen as ignoring the history (and what might be suspected, the future) of much geography education, a potential corollary to deconstructing their own particular pedagogical discourses is that geography teachers are required to do no other than teach the particular subject which constitutes them, nor ought they to try.

A Nietzschean twist to this postmodernist critique might argue that the basis of pedagogical discourse conceals an important myth: they mask a 'will-to-power' and in doing so the critique reveals the necessity, as well as the ungrounded character, of the meta-narrative articulated by much contemporary EE. For instance, it can be argued that sustainability remains privileged even when it comes disguised as the legitimate reconstructivist goal of the educational process, as evidenced in recent deliberations on 'education for sustainability' (e.g. Huckle & Sterling, 1996). Thus in considering Nietzsche, it might be important to ask why teachers and pupils should heed the rhetoric of EE, while also questioning whether it really is their business as geography teachers to be contributing to pupils' EE.

Again, such a critique can be quite powerful, particularly in highlighting issues related to reflexivity and subject identity, but I would suggest that it can imbue pedagogical discourse with aspects of a nostalgic, nihilistic and retrogressive vision. Such a vision might paralyse education through a deconstructive process that excludes aspects of the teleological, exploratory, experiential and praxis dimensions of EE and geographical education. However, despite their limitations, what both kinds of critique do is alert researchers, teachers and readers to the notion that both geography teaching and contributions to pupils' EE are inextricably tied to a socio-political nexus, and that an analysis such as this one might also pay more attention to the complex relationships between contested conceptions of, say, class, gender and ethnicity, which previously remained invisible and silent in the thesis.

REFERENCES

Calderhead, J. (1996) Teachers: beliefs and knowledge. In: D. C. Berliner and R. C. Calfee (Eds) *Handbook of Educational Psychology.* New York: Macmillan Reference.

Clandinin, D. (1986) *Classroom Practice: Teacher Images in Action.* London: Falmer Press.

Coffey, A. & Atkinson, P. (1996) *Making Sense of Qualitative Data: Complementary Research Strategies.* Thousand Oaks, CA: Sage.

Huckle, J. & Sterling, S. (Eds) (1996) *Education for Sustainability.* London: Earthscan.

Layder, D. (1994) *Understanding Social Theory.* London: Sage.

Mrazek, R. (Ed) (1993) *Alternative Paradigms in Environmental Education Research.* Troy, Ohio: North American Association for Environmental Education.

Reid, A. (1998) *How does the geography teacher contribute to pupils' environmental education?* University of Bath: unpublished doctoral thesis.

Reid, A., Scott, B. and Oulton, C. (1997) Investigating teachers' thinking: methodological considerations and issues', *International Research in Geographical and Environmental Education, 6(3): 222-233.*

Robinson, V. (1993) *Problem-Based Methodology.* Oxford: Pergamon Press.

Robottom, I. and Hart, P. (1993) *Research in Environmental Education: Engaging the Debate*. Geelong: Deakin University Press.

Shulman, L. (1981) Disciplines of inquiry in education, *Educational Researcher, 10(6):4-23.*

Tilbury, D. (1994) *Environmental Education: Developing a Model for Initial Teacher Education*. University of Cambridge: unpublished doctoral thesis.

FIELDWORK AND THE DEVELOPMENT OF THINKING SKILLS IN GEOGRAPHY AND ENVIRONMENTAL EDUCATION

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This paper examines the role of fieldwork within the Geography curriculum and environmental education programmes with particular reference to its contribution to the development of thinking skills. Recent research in science education through the Cognitive Acceleration in Science Education (CASE) Project has emphasised the role of teaching using tasks that challenge children to think and problem solve in enhancing the development of pupils' understanding. This work has been applied in the field of geographical education by the 'Thinking Through Geography' team, which has developed approaches to enhancing thinking skills using a wide range of strategies from 'mind movies' to 'story telling'. The focus of this paper is on the contribution of fieldwork to developing thinking skills. The traditional view that 'the field is the geographer's laboratory' opens up opportunities for enquiry-based work and problem solving with real examples that push children towards the development of high order cognitive skills. Furthermore, the demonstration by research in both the USA and the UK that it is the persistence of cognitive gain that characterises the principal benefits of fieldwork suggests that fieldwork might provide an important approach to enhancing thinking skills and cognitive acceleration both within geography/environmental education and across the school curriculum as a whole. This paper draws together and critiques the evidence for the cognitive benefits of fieldwork, and explores some of the strategies for fieldwork that these findings might promote as being especially valuable.

Key words :

Fieldwork
Thinking skills
Planning
Cognitive gain
Geography
Environment

FIELDWORK AND THE DEVELOPMENT OF THINKING SKILLS IN GEOGRAPHY AND ENVIRONMENTAL EDUCATION

Nick Foskett

1. INTRODUCTION

This paper examines the role of fieldwork within geography and environmental education curricula with particular reference to its contribution to the development of thinking skills. Stoddart (1986) suggests that the acquisition of 'real' geographical knowledge takes place in the field as a result of an interaction of physical, mental and emotional experiences, and the Geography National Curriculum in England and Wales has seen this as sufficiently important to include fieldwork as a compulsory element. In environmental education the role of direct field experience has long been emphasised, too, with the notion of 'education in the environment' having roots that can be traced back to The Belgrade Charter of 1975.

2. THINKING SKILLS AND COGNITIVE ACCELERATION

Recent research in science education has emphasised the role of teaching using tasks that challenge children to think and problem solve in enhancing pupils' 'cognitive gain'. The Cognitive Acceleration in Science Education (CASE) Project (Adey and Shayer, 1994) has developed activities which challenge pupils to question, theorise and hypothesise. The aim is that pupils should be pushed to work with cognitive skills that are more challenging than 'knowing' and 'understanding' - areas of thinking that include analysis, evaluation and problem solving. In this way not only is their work in science furthered but they also acquire skills essential to scientific *thinking*. Adey and Shayer suggest that such work also enhances pupil achievement, thereby raising output 'standards'. In a culture stressing school effectiveness, and the raising of standards, such developments are welcomed by pupils, parents, teachers, education authorities and politicians.

'Thinking skills' is an umbrella term embracing a wide range of 'skills', for example, 'deciding', 'choosing', 'reasoning', 'deducing', and 'applying logical thinking'. At a simple level we can distinguish 'creative skills', which are constructive and involve drawing information and ideas and imagination together to generate a new perspective; and 'critical skills', which are deconstructive and involve reducing ideas to their component parts. Sternberg (1985) has developed a 'triarchic classification' of thinking skills, distinguishing 'knowledge components', 'performance components' and 'metacomponents'. Knowledge components involve inputs to the mind - 'seeing', 'hearing', 'scanning', 'analysing'. Performance components involve outputs from the mind following intellectual processing that the child has undertaken, and include 'remembering', 'reflecting' and 'decision-making'. Metacomponents relate to the control of thinking and the notion of 'metacognition' - in simple terms, 'thinking about thinking', and include skills such as 'planning' and 'evaluating'. However, if thinking skills are to lead to cognitive acceleration beyond the narrow field in which they have been acquired then pupils must also be able to 'transfer' those skills. Transfer is essentially the extent to which current learning enhances subsequent learning,

and can be seen in two ways - as 'lateral transfer' in which the ideas and skills are used in a different but no more challenging situation, and 'vertical transfer' in which they are used in a more challenging or complex situation. Leat (1998) describes this process of transfer as 'bridging' and emphasises that it provides a 'multiplier effect' in the pupils learning.

3. THINKING SKILLS AND LEARNING GEOGRAPHY

The development of thinking skills has been applied in geographical education by the 'Thinking Through Geography' project (Leat, 1998). This has developed approaches to enhancing thinking skills using a wide range of strategies, each focusing on a generic concept important within geography but having great utility for transfer to other arenas. The 'big concepts' (Leat, 1998, p167) used include 'classification', 'cause and effect', and 'systems'. Teaching strategies are innovative and varied and include approaches entitled 'odd one out', 'mind movies' and 'mysteries' (Leat, 1998, pp 7-8.) By using such 'thinking activities' pupils start to develop analytical and reasoning skills which support 'transfer', metacognition, and increasingly independent learning through questioning and thinking.

4. THINKING SKILLS AND FIELDWORK

This paper argues that the potential benefits of a thinking skills approach can be subject to a further multiplier effect if conducted through fieldwork. Teachers have long had to make the case for fieldwork. If we are to argue for its inclusion in the curriculum, we must demonstrate its real educational value, and what it can contribute to teaching, learning and pupil outcomes that cannot be delivered more quickly and cheaply in the classroom. If we can show that fieldwork accelerates cognitive gain and the development of thinking skills, metacognition and independent learning, its credentials will be confirmed. We can identify three dimensions in making the case for fieldwork as a contributor to thinking skills.

Firstly, there is the direct evidence of experience. Boardman (1974) and Smith (1999) working with geographers, and Fido and Gayford (1982) working with biology teachers, demonstrate the view from many teachers that fieldwork pushes children towards higher order cognitive skills. Smith (1987), on the basis of school inspection in the UK, suggests that benefits accrue to pupils through cognitive development, physical challenge and personal development. More recently, OFSTED (Office for Standard in Education) inspection has suggested a strong link between high achievement in geography in schools and a high profile for fieldwork in the curriculum (Smith, 1997).

Secondly, there is the inferential evidence from psychology that experiential learning enhances pupil learning outcomes. The constructivist perspective (e.g. Driver et al, 1994) supports the importance of hypothesising, active enquiry and the testing of ideas in new environments, and underpins much of the theoretical framework of the CASE science developments. Fieldwork provides such a new environment.

Thirdly, empirical research supports the idea that fieldwork enhances cognitive and affective gain. Mackenzie and White (1982) identified the overall cognitive gain from

fieldwork, and note the enhanced gain from 'active' as opposed to 'passive' fieldwork. They suggest that 'memorable episodes' (getting wet ?) enhance learning and improve long term knowledge retention. Kern and Carpenter (1986), working with US college students, indicate that fieldwork is especially beneficial in enhancing higher order cognitive skills. The development of the affective domain is also evidenced by research. Harvey (1991), for example, working with A-level students in the UK, suggests that the affective gains outweigh cognitive gains from residential fieldwork in the long term. Affective gain may be important though not just for its own development but for its links with cognitive gain. Mackenzie et al (1986), looking at residential fieldwork in the USA, suggest that cognitive gains are reinforced by the affective development of students, and Nundy (1998) supports this idea very strongly. Nundy's work has examined the gains to primary age pupils of fieldwork in comparison to pupils studying the same topic within the classroom. In particular, Nundy shows clear enhancement in terms of constructing learning frameworks, the development of self image and the development of meaningful learning itself for those pupils studying by fieldwork rather than classwork, and emphasises that it is the interaction of affective and cognitive development which enhances the cognitive gain from the challenge of investigative and 'thinking' tasks in the field. He suggests that...

> *'...residential field course frameworks can (...) lead to enhanced levels of learning outcome. (....). Subjects have to be presented with 'challenges', be involved with group work and 'talk' and have the opportunity to control and re-construct their learning and thinking'* (Nundy, 1999, (in press))

5. DEVELOPING THINKING SKILLS STRATEGIES IN FIELDWORK

Much of the writing on fieldwork in recent years has stressed the role of 'field enquiry' as a key strategy (Job, 1996; Foskett, 1997). It is possible to consider such approaches in terms of how they might contribute to the development of each area of thinking skills as defined by Sternberg's triarchic classification.

i) Knowledge Components

An important aspect of all fieldwork is observation, recording and data collection and the process of 'monitoring' that data to be critical of its character and implications. Leat's 'mysteries' approach (Leat, 1998) provides a 'thinking skills' perspective on such knowledge components. Similarly Bartlett's work on field sketching (Bartlett, 1998) develops both the motor skills of field sketching and the analytical skills essential to selecting content by evaluating differing types of information.

ii)Performance Components

Performance has traditionally been a rather restricted component of fieldwork, and has often been limited to narrow data presentation. Its extension to problem-solving and decision-making has been an outcome of issue-based fieldwork. Such activities require data processing, critical review and the formulation of logical argument, mostly achieved through groupwork, discussion and presentation. The role of 'talk' in developing such 'thinking skills' is stressed by Adey and Shayer (1994), Nundy (1997) and Leat (1998).

iii) Metacomponents

A key aim of enquiry-based fieldwork is the development of independent enquiry skills by pupils. The centrality within that process of metacognition skills is clear in the planning, reviewing, evaluating and reflection skills which it needs. The evidence from the CASE programme of the role of discussion, group work and talk in laboratory enquiry in moving pupils towards greater metacognition is strong. The recognition that the 'field' is the geographer's or environmental scientist's 'laboratory' provides a useful parallel in identifying the potential gains in this area from fieldwork.

iv) Transfer

Transfer is essential evidence of high level thinking skills. In fieldwork the opportunity for classroom to field to classroom transfer of knowledge and ideas is large, whether through testing theories from classwork by hypothesis testing or by generating theories from field observation. Both vertical and lateral transfer can be integrated into planning fieldwork enquiry by emphasising 'transfer' issues throughout. Transfer may also be advanced further than in classwork because of the affective-cognitive gain synergy already identified.

Specific examples of the development of thinking skills through fieldwork can be seen in the model outlined in Figure 1.This represents a starting point for planning, for each stage will require careful management to optimise the learning processes enhancing cognitive gain (groupwork, pupil talk, teacher-pupil discussion, hypothesising), while ensuring the affective dimensions of personal development are used to reinforce cognitive gain.

Stage	Thinking Skills Processes	Fieldwork Planning Process	Example
1	Lateral Transfer From Classwork	Developing Enquiry Questions or Setting Up Hypotheses	Set up 'enquiry' into impact of tourism on e.g. a local beauty spot.
2	Knowledge Components	Reflective and Critical Data Collection	Consider litter survey, erosion of footpath measures, visitor interviews as data methods. Monitor data as collected
3	Performance Components	Decision-making, Problem-solving, Hypothesising	Present alternative models for managing tourism
4	Metacomponents	Evaluating group/individual knowledge/performance components	Evaluate data collection Evaluate group/ individual role
5	Transfer - Lateral	Integration of findings and principles into classwork or other subject areas	Re-visit environmental management topic Apply findings to different cases
6	Transfer - Vertical	Construction of higher levels of model refinement Linkage to 'big concepts'	Draw out big concepts of 'cause and effect', 'planning', 'decision-making' etc

Figure 1: Integrating thinking skills development into fieldwork planning

6. IN CONCLUSION

The development of thinking skills as a route towards accelerating cognitive gain has started to impact on thinking about teaching and learning in geography and environmental education. The potential contribution of fieldwork to accelerating this gain because of the

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synergy of affective experiences and cognitive development has emerged from research. If fieldwork provides an acceleration process and can support 'transfer' then its role in enhancing pupil perfomance across the curriculum may be important. Research needs to be undertaken to examine and test these ideas, but matching the theoretical perspectives emerging from the 'thinking skills' research and the 'grounded theory' of those with experience of fieldwork would seem to be more than a happy coincidence.

REFERENCES

Adey, P. and Shayer, M. (1994) *Really raising standards* London: Routledge

Bartlett, K. (1998) *Field Sketching in the Geography Curriculum* Unpublished PhD Thesis, University of Southampton

Boardman, D. (1974) 'Objectives and constraints on geographical fieldwork', *Journal of Curriculum Studies.* 6(1), 158-166

Driver, R., Squires, A., Rushworth, P., and Wood-Robinson, J.(1994) *Making Sense of Secondary Science* London: Routledge

Fido, H. and Gayford, C. (1982) 'Fieldwork and the biology teacher: A survey in secondary schools in England, *Journal of Biological Education* 16(1), pp27-34

Foskett, N.H. (1997)'Teaching and learning through Fieldwork'. In Tilbury, D. and Williams, M. (eds) *Teaching and Learning Geography.* London: Routledge

Harvey, P.K. (1991) *'The role and value of A-level geography fieldwork: A case study'*, Unpublished PhD thesis, University of Durham

Job, D. (1996) 'Geography and environmental education: an exploration of perspectives and strategies'. In Kent, A. et al (eds) *Geography in Education.* Cambridge: CUP

Kern, E.L. and Carpenter, J.R. (1986) 'Effect of field activities on student learning', *Journal of Geological Education* 34, 180-183

Leat, D. (1998) *Thinking Through Geography* Cambridge: Chris Kington Publishing

MacKenzie, G.D., Utgard, R.O. and Lisowski, M. (1986) The importance of field trips, *Journal of College Science Teaching,* 16, 17-20

Mackenzie, A.A. and White, R.T. (1982) 'Fieldwork in geography and long term memory structures'. *American Educational Research Journal* 19(4), 623-632

Nundy,S. (1998) *The fieldwork effect: An explanation of the role and impact of fieldwork at key stage two'* Unpublished PhD thesis, University of Southampton

Nundy, S. (1999 - in press) 'The fieldwork effect: the role and impact of fieldwork in the upper primary school' , *Intn'l Res. in Geographical and Environmental Education*

Smith, G. (1999 - in press) 'Changing fieldwork objectives and constraints in secondary schools' *International Res. in Geographical and Environmental Education*

Smith, P.(1987) 'Outdoor education and its educational objectives'. *Geography* 72(2), 209-16

Smith, P.R. (1997) 'Standards achieved: a review of geography in secondary schools in England, 1995-96', *Teaching Geography* 22(3), 125-126

Sternberg, R.J.(1985) *Beyond IQ: A Triarchic Theory of Human Intelligence,* Cambridge; CUP

Stoddart, D.R. (1986) *On Geography and its History,* Oxford; Blackwell

INTERDISCIPLINARY URBAN RIVER STUDIES: THE CHICAGO RIVER

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Seventeenth Century explorer Louis Joliet understood the potential of the Chicago River, the modest stream that is the key water link between North America's Great Lakes and the Gulf of Mexico. Others settled on its banks and built Chicago, one of the world's most vibrant cities. Many others have followed Joliet and Chicago's founders in recognizing the value of the river. The latest have been Chicago educators who are using this urban stream for interdisciplinary study by Chicago's students and involving those students in stewardship of the river. They work with Friends of the Chicago River, an organization dedicated to fostering the vitality of the stream for human, plant, and animal communities within its watershed.

The Chicago River is a remarkable classroom. Its history is rich, its geography is significant, and its ecology complex. Scores of teachers and hundreds of students are now active annually within the Chicago River Schools Network. This relatively recent initiative of Friends of the Chicago River has been developed in collaboration with several governmental bodies, other non-for-profit organizations, institutions of higher education, and--- most importantly--- with the enthusiastic involvement of teachers and students of the Chicago River watershed.

This paper reports on the development of the program, explores the contributions and interactions of its many participants, and discusses it educational value in the contexts of engaged and service learning.

Key words :

Chicago
River
Interdisciplinary
Urban River Studies

INTERDISCIPLINARY URBAN RIVER STUDIES: THE CHICAGO RIVER

John H Giles and Chris Parson

1 THE CHICAGO RIVER AS A CLASSROOM

The Chicago River is a remarkable classroom. Its history is rich, its geography is significant, and its ecology complex. Scores of teachers and hundreds of their students are now active annually within the Chicago River Schools Network. This is a 1996 initiative of Friends of the Chicago River, an organization dedicated to fostering the vitality of the stream for human, plant and animal communities within its watershed. The initiative has been developed in collaboration with several governmental bodies, other not-for-profit organizations, institutions of higher education, and, most importantly, with the enthusiastic involvement of teachers and students. This paper reports on the development of the program, explores the contributions and interactions of its many participants, and discusses its educational value in the contexts of engaged and service learning.

2 PARTNERS

A very important characteristic of river studies in Chicago is the participation of several sponsors and partners. Another is that they are part of a statewide effort to improve environmental monitoring. That is a good place to begin to understand how river studies fit into a much broader picture.

The Illinois Critical Trends Assessment Project (CTAP) was launched in 1991 by the Illinois Department of Natural Resources (IDNR). Illinois has always been well-documented. The problem was that all the information about its varied ecosystems was dispersed. CTAP retrieved and consolidated these data in a seven-volume, 1,300-page report only to find, first, that many conventional sources of pollution have declined in Illinois; second, that the state's ecosystems were evolving from complex into simple, less stable ones; but that, third, regardless of the reams of data, there was not enough to assess trends (Jeffords,1998).

What next? Although IDNR quickly set a team of five field biologists to work in an ongoing statewide monitoring program, the task of collecting sufficient data was overwhelming. The next inspiration was to recruit and train "citizen scientists" to monitor major ecosystems, including streams, forests, wetlands, and prairies. This effort was dubbed "EcoWatch." The first monitoring effort, "RiverWatch," focused on streams. The scientists trained environmentally-sensitive volunteers of all stripes, many being teachers and students. They were taught the scientific protocols and asked to monitor selected sites on an annual basis.

In the meantime, curriculum resources were being developed independently to support school-based efforts. Dr. Robert Williams, a biologist and curriculum specialist at the University of Southern Illinois at Edwardsville, produced a comprehensive interdisciplinary curriculum for secondary schools (Illinois Rivers Curriculum Project, 1997, 1998). Dr. Marylin Lisowski, of Eastern Illinois University, developed "PLAN-IT EARTH," Pairing

Learners and Nature with Innovative Technology," which is designed to give CTAP EcoWatch teacher and student volunteers necessary background for monitoring work (Plan-It Earth Project, 1998).

Further structure and coordination for school efforts was evolving. In Chicago, Friends of the Chicago River (FOCR), founded in 1979, has matured into an effective citizen action group at work to restore and conserve one of America's smallest but most important rivers. The Chicago River is the critical creek which cuts through a sub-continental divide thus linking the Great Lakes with the Mississippi River system and opening up the rich North American heartland to the world. Despite its importance, the Chicago River didn't have many friends until FOCR was organized. It has never caught fire as the Cayahoga River passing through Cleveland, Ohio, once did, but Chicago has always been a working town--- and it put the river to work. Indeed, its natural flow was reversed so it drained not into Lake Michigan, the source of Chicago's drinking water, but southwest ultimately into the Mississippi!

In 1996, FOCR became a key member of the environmentally aware extended family of educators, agencies, and associations supporting schools in Chicago by launching the Chicago River Schools Network (CRSN). This educational support program and network aims to achieve the ultimate goal of environmental education as defined in the Tbilisi Declaration from the Unesco Conference, which is "to establish a literate and involved citizenry (Unesco, 1978).

The program addresses five areas of environmental education: awareness, knowledge, attitudes, skills and participation (Hungerford, Peyton and Wilke, 1980):

- Awareness: Helping students acquire awareness and sensitivity to the total environmental topic and its problems;
- Knowledge: Helping students acquire a basic understanding of how the environmental topic of study functions;
- Attitude: Helping students acquire a set of values and feeling of concern for the environmental topic and the motivation and commitment to participate in its maintenance and improvement;
- Skill: Helping students identify the skills needed to identify, investigate and contribute to the resolution of environmental topics' problems and issues;
- Participation: Helping students acquire experience in using their acquired skills in taking thoughtful, positive action toward the resolution of the environmental topic's problems and issues.

The Chicago River Schools Network is managed by FOCR with an advisory committee of experienced educators. It recruits teachers in all disciplines and helps them to use the river in their curricula and to conduct action projects. It coordinates monitoring sites on the river. It promotes and coordinates teacher training, sponsoring workshops and providing educators with resources. The workshops are often staffed by trainers from the Illinois Rivers Project using the Illinois Rivers Curriculum, but FOCR does not dictate a curriculum or insist upon a rigid program. Instead, it suggests and supports several levels of training and involvement Other activities include publication of a newsletter to keep participants updated. It is

developing internet-based resources. FOCR also sponsors an annual student congress, other meetings and an annual clean-up day. It provides an invaluable link to volunteer partners in the professional and business communities as well as knowledgeable governmental experts to work with schools in classroom and field work. By the end of the 1997 - 1998 school year, FOCR's network included 57 teachers in 25 schools who involved at least 1,700 students. During the year, FOCR also made presentations to 309 teachers and 2,762 students (Friends of the Chicago River, 1998).

To illustrate how schools tie into the CRSN, let us look at an early participant, Schurz High School, a general Chicago public high school serving low income inner city students. Schurz student "river rats" first went to the river in 1994. Environmental education had never been sustained at the school, but had occasionally found its way into individual science classrooms. Then a team of three teachers of Biology, Geography and English began interdisciplinary river studies with the Illinois Rivers Curriculum. They quickly made contact with Friends of the Chicago River, which had yet to launch CRSN, to develop an informal but active partnership. Schurz teachers encouraged the development of the network, and, when CRSN was born, the school was among the first to join.

The Schurz High School program is now in its sixth year, and it has grown along with CRSN. Like the network, the school program has always been open to any interested teachers, expanding to include their disciplines. When other demands have limited teacher involvement, the program has adapted. The number of participating students has varied from year to year depending on the model of instruction followed. Five weeks are normally devoted to the project. Within that time frame two models have been followed. One has been to match and swap selected sections of students among the participating teachers so that they teach their specialties to the whole group. The other has been to work before and after the normal school day with a smaller group of students drawn from a broader range of sections.

The educational goals reflect the Illinois Rivers Project curriculum:

- to learn and practice scientific methods and laboratory techniques, and to record and analyze scientific observations;
- to learn the history of the river and its geography, focusing especially on human-environmental interaction involving the river and the people of Chicago and include making and using maps and recording and analyzing geographic observations;
- to learn different communications styles by keeping a journal and completing other exercises, such as recording assignments and observations, keeping lecture notes, composing poetry and stories, and writing advocacy letters;
- to participate in efforts to restore and preserve the river for compatible human development and natural purposes.

What success have river studies had at the high school? Preliminary anecdotal evidence of success is promising. Notable among the authors' observations are the following:

- Informal student critiques of the program have been overwhelmingly positive;
- In a 1993-94 comparison of the general academic progress of geography students in

and out of the program, participants had fewer Ds and Fs (45% compared to 71%) and more As and Bs (42% compared to 11%) indicating, possibly, that interdisciplinary field studies may have a general motivating effect;

- The field-based interdisciplinary studies have been effective with students of very different aptitudes and abilities, ranging from behaviorally disordered, educably mentally handicapped students to class valedictorians;
- In 1997, a team of Schurz students sponsored by the Illinois State Board of Education made a presentation to the Chicago business community on how they integrated technology into their river studies work;
- In 1998, a team of students taught chemical and physical testing methods to teachers new to the CRSN. In 1999, another team is writing and producing a videotape on service learning for use by FOCR and the Chicago Board of Education;
- A sense of stewardship is being fostered. In the project's first year, 1994, only one student and a single teacher supported FOCR's annual river clean-up. In 1998, 75 students and teachers participated in the Sunday activity. In 1998, the school managed the most active site on the river.

3 DISCUSSION: PROMISING PROGRESS

Although the anecdotal evidence at one school is promising, there is a clear need for systematic evaluation of the effectiveness of Chicago River studies. Initial steps are being taken in 1999. CRSN teachers and students will be evaluated for changes in attitude and comprehension in pre- and post-program tests. This, of course, still begs the question how effective this form of engaged learning may be compared with traditional methods of environmental education. But it is a necessary first step.

What kinds of students appear to profit from such hands-on learning? The opportunity is provided to students of many ability levels, from the least to the most academically able. Most have become actively engaged albeit at different levels. The cooperative nature of the learning provides meaningful roles for all participants. The interdisciplinary project experience moves from classroom to the field and back to the laboratory, thus providing "real world" context for student work. Students learn and practice a number of skills and develop a sense of meaningful involvement knowing that their data are part of the official Illinois CTAP monitoring process. Many participate in community service, both in river cleanup activities and in teaching and mentoring roles. The traditional curriculum offers few opportunities of this sort.

How extensive can the curriculum be? River studies appear to work at every student learning level from discovery to analysis, then on to reflection and stewardship. Taking one hundred street-wise but parochial "urban villagers" streamside in a forest preserve on a Spring day has its challenges. These challenges and limited time to coach large groups effectively limit the depth of the learning, but valuable exposure to the environment is given to many students who otherwise are naive about nature and fearful of leaving their city neighborhoods. On the other hand, significant results have been achieved by coaching small groups of students through the learning process and on to new challenges, such as training teachers, making presentations at educational and business meetings, and mentoring other students.

How do river studies benefit a school? Curriculum reform in Chicago now features environmental education. Educators are increasingly aware of its value. The engaged interdisciplinary nature of river studies makes them a very attractive offering in the curriculum where their presence can stimulate more engaged learning in other classrooms. Pragmatic administrators also have learned that river studies draw money to their schools. For example, Schurz teachers received three foundation grants in the first five years of the program. Community linkages are also enhanced in a day when schools reach out increasingly to others in their communities for help in enriching the educational environment.

What are the roles of partners for river studies? Partners are crucial to success. These include coordinators, funders, curriculum specialists, and experts. For example, FOCR provides vital structure, coordination and continuity. Building on a foundation of interest, however, was not possible until there was money for bricks. Funding has also underwritten curriculum development upon which FOCR and the schools depend. River-wise writers and experts have provided valuable knowledge and skills in the classroom and in the field.

4 CONCLUSIONS

Although there appears to be a successful start to sustaining river studies in the Chicago River watershed, there is a very clear need for systematic evaluation of their impact on students, teachers, schools and the general community. The first study is now being undertaken with teachers and students. This effort should be followed by similar studies including all partners. In addition, there are rich opportunities for methodological studies.

5 REFERENCES

Friends of the Chicago River (1998) *Annual Report, School Year 1997 - 1998, Chicago River School Network*. Chicago.

Hungerford, H. R., R. Peyton and R. J. Wilke (1980) "Goals for Curriculum Development in Environmental Education." *Journal of Environmental Education, II(3): 42-47.*

Illinois Rivers Curriculum Project, Williams, Robert, project director (1997, 1998) *Rivers Curriculum Guides: Biology, Chemistry, Earth Science., English, Geography, Mathematics* . White Plains (NY): Dale Seymour Publications

Jeffords, Michael R. (1998) Pulling It All Together: The Critical Trends Assessment Project. *The Illinois Steward. Spring 7(1):17-24.*

Plan-It Earth Project, Lisowski, Marylin, project director (1998) *PLAN-IT EARTH Curriculum.* Illinois Department of Natural Resources & Illinois State Board of Education.

United Nations Educational, Scientific and Cultural Organization (1978). *Final Report: Intergovernmental Conference on Environmental Education*, Organized by UNESCO in Cooperation with UNEP, Tbilisi, Georgia, USSR, 14-26 October 1977. Paris: Unesco ED/MD/49.

THE LOCAL LANDSCAPE AND FIELDWORKS IN TEACHING GEOGRAPHY IN FINNISH SCHOOLS

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This paper seeks to explore the impact of geographical teacher quides and the social situation in Finland on the textbooks in geographical landscape teaching in 1994.

The analysis considers two geographical textbook series and one teacher guide for 7 to 18 year olds published in 1994. The method is discourse analysis. Discourse analysis is an interdisciplinary research branch that investigates the many dimensions of the text, talk and their cognitive, social and cultural contexts. As the context has described the Finnish landscape, social situation and the tradition of Finnish landscape teaching.

In Finland we have a famous geographical tradition of research into landscapes since the beginning of this century. Granö's method has been used in universities for many decades. Now we have a new wave in landscape research in human and environmental geography.

The Finnish landscape is quite flat. The most important elements in most of the countryside are coniferous forest and lakes. The largest fields are in southern and western Finland, where there also are a lot of small rivers draining into the Baltic Sea. The Ice Age has taken away fossils and old sediments. Important elements are Ice Age formations. The rural settlement is spread. Population density is low. The largest cities are in southern and south-western Finland. We have only few really old houses. The snow in winter is an important element. The Finnish landscape is beautiful but there are not so many geological and historical layers as for example in England.

In the beginning of this century Finland had a very powerful national romanticist period. In 1918 Finland became independent. The nationalism had an impact on arts, literature and landscape teaching too. After the second world war we had a social break. In the 1960's people moved into the cities. New buildings changed the views and people had to adapt to the new situations. The new ideas in geography teaching came into Finland. We did not have the old tradition of teaching Finnish landscapes through fieldwork as in England. So we have forgotten that deep analysis for landscape studies in school is necessary.

One important result reported in this paper is that in 1994 Finnish geography teaching had forgotten the system of how to teach home landscape and the fieldworks associated with it. We can find reasons for that in Finnish culture and traditions of geography teaching.

Key Words :

Landscapes
Geography teaching
Discourse analysis
Textbooks
The teacher guide
The school

THE LOCAL LANDSCAPE AND FIELDWORKS IN TEACHING GEOGRAPHY IN FINNISH SCHOOLS

Leena K. Lahti

1. INTRODUCTION

Geographical education has long tradition in teaching local landscapes with fieldworks in many European countries. In Finnish schools the tradition is very scanty or it is lacking. Geographical education, as for other subjects in the formal education curriculum, continuous to change as it reflects the changing orientations and priorities of the society in wich it is located. The new trends in environmental education has great questions for geography in understanding the local landscape, the nature and its history, human impact on it and its meaning for people too.

This paper will focus on some background about the contribution of 1) the Finnish history and social situation, 2) the situation and development of the Finnish school geography and 3) the Finnish landscapes in general, into the lack of fieldcourses in local landscape teaching and also the scanty of the geographical local local studies in Finland.

2.DISCOURCE ANALYSIS IN EVALUATING GEOGRAPHICAL LOCAL STUDIES

Discource analysis have been developed to examine ways in which knowledge is socially constructed in educational settings (Dijk 1985, Gee and Green 1998). The method helps to understand how education and curriculum are constructed acros time, groups, and event. By discource analysis we can see the geographical curriculum and textbooks as a sociocultural results. Bennett (1996) says that deconstruction by discource analysis is essentially critical. The sociocultural background to Finnish geographical curriculum and the lack of local landscape teaching with fieldworks we can find in Finnsih history, development of the school geography and also in Finnish landscapes. In this study after descripting them the writter has choose factors that seems to effect on the lack of local landscape teaching. Reason to write about this queston is because in many other countries and fieldcourses in geographycal teaching are a tradition. (Schmidt 1987, Haubrich 1987, DEE 1995:2).

2.1 Content of geographical textbooks and teachers quide in 1994

Some textbook series has analysed for this paper. (Form 2: Aho etc 1988, Karhiola etc. 1994, Form 3: Ilves and Lappalainen 1985, Nyberg 1994, Aho 1995, Form 9 : Leinonen etc. 1985, Arohonka etc 1994, Form 3 in the high school: Ervasti etc 1991). Before 1994 in national curriculum Finnish geography was situated in Forms 2, 3 and 9. (POPS 1985) After 1994 (POPS 1994) the national curriculum has been very free. In forms 2 and 3 local studies are with., but only very little. The situation is same in Form 9. In teachers quide in 1995 can read that by teaching minerals and Ice Age they scould go out of doors after preparin in the classroom. The local map working is very carefully clarified in forms 2-3. There are the fieldworks with but they should do with yhe the sport lessons. So the landscapes are there not so important than the map works. In the last year in the high school students can do an optional regional research. The region can be a foreign country or a village. If they chose a village they have a possibility to study local landscapes too. (Rikkinen 1998 b).

The question in this paper is why we have so little local studies in Finland. Hannele Rikkinen (1998 a) says in her new book that we have got very little fieldworks in Finnish school geography. They are not easy to organize and it is not easy to do suitable programs for them. They have been more important in biology. This same system is in official quides for teachers (National Board of Education 1985, 1994, Rikkinen 1998 a).

2.2 Finnish society during two centuries

The Finnish culture is not very old. Before 1809 Finland was a part of Sweden and after that for over 100 years it was connected with Russian as an autonomy region.

During the Russian time the sense of Finnish national identity was beginning to emerge. It absorbed much of his inspiration from Swedish idealist romanticism. (Anttila 1936, Klinge 1980). National romanticism awoke Finnish litterature linked with Finnish language, composeds and artists. Lönnroth collected Kalevala (1985). In architectur the national romanticism found as carelinism and decorative style. Building materials were often Finnsih wood or granit. In paintings were often pictured Finnsih views. The period of national awaking continued until and after the First World War and after the Finnish independency 1918 (Klinge 1980, 1983).

After the Second World War Finland settled 400 000 people, the carelian evacuees and Finnsih soldiers. This system brang lot of new farms into the countryside (Hämynen and Lahti 1983). New buildings planned in same model changed the landscape too. For war indemnity Finland had to create new industry.

In 1960's in Finland begun the great social break. People moved into cities after new work, industry and sevicies. The rural area became desolate. People losed contact to their old lifestyle and traditions. TV and an American influence changed the Finnish society.

2.3 Finnish landscape

Finnish landscape is quite flat. The most important elements in most of the countryside are coniferous and lakes. The largest fields are in southern and western Finland where also are lot of small rivers draining into the Baltic See. The Ice Age has taken away fossiles and old sediments. Important elements are the Ice Age formations covering the archean bedrock. The snow and ice covering the lakes are important elements in winter. Rural settlement is spread. The largest cities are in southern and soth-western part of the country. In Finland are only few really old houses. Finnish landscapes are beutiful but there are not so much geological and historical layers as for exempel in England.

2.4 University geography

Hannele Rikkinen (1982) has descriped the development of university geography in Finland. Before 1890 geography was a part of history. In 1890's geography established the first chair. Now it became a natural science. After 1920 landscape geography was important. Since the Second World War the quantitativism, system theorias and human geography took more place. In 1970's areal planning, the ecological approach, global problems were all ones which tend to draw the various branches closer connected with every day life. One of the newist branches in humanistic geography is to research iconography of landscapes (Karjalainen 1990, Raivio 1996).

2.5 Landscapes in school geography during two centuries

In Finland the school geography was at first connected to history (Rikkinen 1982). During the Sweden time school tecahing was close to Sweden and German system. Russian time brought the Rusiian geography. The period of national awaking was reflected in upon Finnish geography and landscapes teaching. Topelius (1876) wrote the book of our land (Maamme kirja) from which countless generations were to glean their knowledge of Finland. The importance of geography in the process of building up a Finnish culture was true. Topelis also did much to promote the landscapebased view of Finland. (Tiitta 1979, Klinge 1980).

Svensson (TPF 1874, Rikkinen 1978) recarded local studies as the appropriate point of departure for the teaching of geography from which one should proceed to map-reading and the study of the earth. He stated that his model for teaching was the german pedagogical school. In German the Haimatkunde has been important. The same ideas had also Soininen (1901) and Hänninen (1928). Soininen wrote about own observations in landscapes and local studies like Pestalozzi. Also Cleve (1884) believed that pupils'instruction should proceed from to know to unknown as a general principle. The known material should be the regarded simply as a part of departure, while the unknown should be the focus of attention. This idea seems to be very close to school geography in Finnish comprehensive school (KM 1988, Rikkinen 1977,1998).

Nordman (1897) publiced the first Finnish textbook of didactics for teachers in geography. In 1932 the Secondary School Committee (KM 1932) believes that bouth geography and natural history are suitable for teaching in the lower levels of the school. It also believed that these subjects offer opportunities for excursions out of doors, which may be adjused in standard to suit the pupils. This report also favoured project work for pupils at the high school level.

Landscape geography was the keyword during the 1930's. An introduction for teachers was given by Dr Väinö Auer, a lecture given at the request of professor J.G. Granö. Later Aaro Hellaakoski became one of the most prominent supports of this trend. (Rikkinen 1982).

During this century geography teaching spread into all forms in the school, and to the establishment of a close connection with natural history (i.e. biology), since these subjects were the responsibility of the same speacialized teachers. (Rikkinen 1982).

Before 1960's geography was even represented on official and unofficial syllabus reform bodies largely by persons with an inclination towards biology (Rikkinen 1982). Later the geographers who has been with this work have an inclination towards the cultural geography. Rikkinen wrote 1977 that in the beginning of the century were trends to take fieldworks into a part of geography. This was why the geography had physical geographical elements. In elementary schools this local studies with fieldworks were very important part. After 1960 the national syllabus is made by geographer who prefer human geography. The fieldcourses have connected into biological education. In Finland we have only one who has written the textbooks for geographical didactic. She has done very much for Finnish school geography but the landscape teaching and fieldcourses we don't have. Now the teaching method in Finland seems to be quite close to Cleves (1884, KM 1988) ideas.

3. CONCLUSIONS

In Finnsih geography teaching is very little local landscape teaching with fieldworks. If we try to understand why situation is what it is we can collect above descripted information into the

table 1. We have had periods with more local landscapes teaching but since 1970 the national curriculum did not more see it necessery. One important reason is that fieldworks are not easy to organize and the ideas of cultural geography (Rikkinen 1977, 1998 a).

TABLE 1. ANALYSIS OF THE REASONS WITCH CAN IMPACT ON THE LACK OF THE LOCAL LANDSCAPE TEACHING WITH FIELDWORKS.

FINNISH HISTORY	IMPACT ON LOCAL LANDSCAPE STUDIES
Sweden time	Not important
Russian time	Only Russian geography important
- National awakning	Landscapes important
World Wars and after 1960	People loosed the old roots
PERIODS IN SCHOOL GEOGRAPHY	
With history	Landscapes not very important
Natural geography	Landscapes with fieldworks important
Cultural geography	Landscapes with fieldworks not important
Old elementary school system	Landscapes and fieldworks important
Comprehensive school (1970-)	Only little landscapes and no fieldworks
FINNISH LANDSCAPE	
Spread settlement	Natur important, not for cultur geography
No old buildings	Too little for cultural geography
No fossils and few historical finds	Not important for cultural geography
Winter	Not easy to organize fieldcourses
UNIVERSITY GEOGRAPHY	
Physical geography	Local landscapes and fieldworks important
Cultural geography (After 1960 important)	Very little landscapes and fieldworks
Quantitatism	Landscapes and fieldworks not very important
Planning geography	Landscapes more important
Environment and geography	Local landscapes important
Humanistic geography	Iconography of landscapes, local landscape important not enough for children

4. REFERENCES

Aho,L, Miettinen, M, Oksanen,U end Uotila,M (1988) *Ympäristöoppi 1+2*. WSOY, Juva.

Aho,L, Enequist,S, Kytömäki,P, Nurmi,J and Saarivuori,M (1995) *Verne 3*. WSOY, Porvoo.

Anttila,A (1936) Kansallinen herääminen ja kielitaistelu. *Suomen kulttuurihistoria IV*, 363-442, Gummerus, Jyväskylä.

Arohonka,J, Kankaanrinta,I and Kytömäki,J (1994) *Värikäs Maa 9*. WSOY, Porvoo.

Bennett,S. (1996) Discource analysis: A Method for deconstruction. In Williams,M. (Ed) *Understanding Geographical and Environmental Education*. Cassell, London.

Cleve, Z.J (1884) *Grunddrag till skolpedagogik*. Helsinki.

Department for Education (1995) Geography in the National Curriculum, London:HMSO.

Ervasti,V, Kytömäki,J, Paananen,J (1991) *Lukiolaisen Terra 3*. WSOY, Porvoo.

Gee,J.P and Green,J.L. (1998) Discource analysis, Learning and Social Practice: A Methodological study. In Pearson,D.P. and Ashgar, I-N. (Eds) *Review of Research in Education*, 23 (119-169). American Educational Research Association.

Haubrich,H. (Ed 1987) *International trends in geographical Education*. International Geographical Union, Comission of Geographical Education.
Hämynen,T, Lahti, L.K. (1983) Sodanjälkeinen asutustoiminta Suomessa. *University of Joensuu, Publications of social and regional sciences N.O 36*, Joensuu.
Hänninen,K (1928) *Maantieteen opetus, Kotiseutuoppi*. Valistus, Helsinki.
Ilves,H and Lappalainen,A (1984) *Avara Maailma 3-4*. WSOY, Juva.
Leinonen,M, Nyberg,T, (1985) *Koulun Maantieto 9*. Otava, Keuruu.
Karhiola,E, Paavilainen,J, Vilska, P and Väisänen,M. (1994)*Luontokirja*. Otava.
Karjalainen,P.T (1990) maiseman kauneuden kulttuurinen ikonografia . In Hult,J (Ed) Virolais-suomalainen ympäristöseminaari 21-22.8.1989 Joensuussa - esitelmät. *Karjalan tutkimuslaitoksen monisteita 4*, 145-154. Joensuu.
Klinge,M (1980) Poliittisen ja kulttuurisen Suomen muodostuminen. *Suomen kulttuurihistoria II*, 192-224, WSOY, Juva.
Klinge,M (1983) *Vihan veljistä valtiososialismiin: yhteiskunnallisia ja kansallisia näkemyksiä 1910- ja 1920-luvuilla*. WSOY. Juva.
KM 1932 :6. Oppikoulukomitean mietintö marraskuun 3 päivältä 1932 (Secondary Schools Committee). Helsinki 1933.
KM = *Komiteamietintö 1988:30*. Matemaattis-luonnontieteellisen perussivistyskomitean välimietintö. Valtion painatuskeskus, Helsinki.
Nordman,P (1987) *Geografiundervisningens mål, medel och metod*. Helsinki.
Nyberg,T, Vestelin, O, Arjanne,S (1995) *Koulun ympäristötieto 3*. Otava. Helsinki.
Peruskoulun opetussuunnitelman perusteet 1985 POPS, National Board of Education, Opetushallitus, Valtion Painatuskeskus. Helsinki.
Peruskoulun opetussuunnitelman perusteet 1994, POPS, National Board of Education, Opetushallitus, Valtion painatuskeskus, Helsinki.
Raivio,P.J (1996) Transformation of Religious Landscapes: The Finnish Ortodox Church. *Nordia Geographical Publications Vol 25:1*. University of Oulu.
Rikkinen,H (1977) *Maantieteen didaktiikka*. Otava. Keuruu.
Rikkinen,H (1982) Developments in the status and content of geography teaching in secondary schools of Finland. *Publicationes Instituti Geographici Universitatis Helsinki A 124*.
Rikkinen,H (Ed 1998a) Maantiede peruskoulun yläasteella. *Studia Paedagogica 18*. Helsingin yliopisto, Opettajankoulutuslaitos, Vantaan täydennyskoulutuslaitos.
Rikkinen H. (Ed 1998b) Maantiede lukiossa. *Studia Paedagogica 19*. Helsingin yliopiston opettajankoulutuslaitos. Vantaan täydennyskoulutuslaitos.
Schmidt, P.R. (1987) Outdoor Education and its Educational Objectives. *Geography 72 (2)*: 209-16.
Soininen,M (1901) *Opetusoppi I*. Otava, Helsinki.
Tiitta,A (1977) *Mantieteen itsenäistymiskehitys Suomessa 1880-1921. Pro gradu thesis. Department of Geography*, University of Helsinki.
Topelius,Z (1876) *Maamme kirja*. Helsinki.
TPF=Tidskrift utgiven av Pedagogiska Föreningen i Finland 1865-1888.
van Dijk,T. (Ed 1985) *Handbook of discource analysis.: Vol. 1. Disciplines of discource*. New York: Academic Press.

" CAVES AND WAVES" - WHAT DO ADVENTUROUS EXPERIENCES DURING FIELD TRIPS MEAN TO PUPILS?

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Recently, more educators have argued for the need to attend to both the cognitive and the affective aspects of fieldwork in geographical and environmental education. Experientially based studies are seen as particularly valuable in understanding the fieldwork experiences of both students and teachers and what meanings they have derived from such experience.

This study is a qualitative case study of two geography field trips for Secondary Four (Year 10) students of mixed abilities in a Hong Kong School. The teachers, focusing on the affective outcomes of fieldwork, were determined to let students attain unusual and memorable experiences by undergoing adventurous activities. The results revealed that while most students generally felt excited and delighted over the challenge, a number of students decided to withdraw from the experience. Students of higher academic achievement appeared to be more critical. Their frustrations were often related to academic learning and the lack of a collective learning atmosphere on the trips. The experience was characterised by a tension of purpose between academic learning on one hand, and fun and excitement on the other.

Key words :
Fieldwork
Experiential learning
Adventure education
Affective learning
Hong Kong

"CAVES AND WAVES" – WHAT DO ADVENTUROUS EXPERIENCES DURING FIELD TRIPS MEAN TO PUPILS?

Kwok Chan LAI

1. INTRODUCTION

Field educators often justify fieldwork by appeal to multiple purposes, and an analysis of its aims is characterized by the diversity of explicit and implicit educational goals. Apart from helping students consolidate and apply classroom learning and acquire practical skills, it also contributes to affective goals such as development of environmental attitudes and personal and social development (see for example, Foskett, 1997; GA Sixth Form - University Working Group, 1984; Kent, Gilbertson & Hunt, 1997; Lonergan & Andresen, 1988).

However, various studies suggested that teachers were mainly occupied with the cognitive and technical aspects of fieldwork. They were less concerned with emotions and feelings which had affected the students' learning and their willingness to participate in further field trips. McPartland and Harvey (1987) demonstrated that the subject-specific purposes of fieldwork remained prevalent, while the use of fieldwork for social purposes or environmental education was not regarded as important. Harvey (1991), in his study of Advanced Level fieldwork, similarly observed that there was an overemphasis on conceptual understanding and a negligence of affective learning and experience. Lai (1996b), in a study of the fieldwork experiences of student teachers, also revealed that their lecturer was concerned with the cognitive and technical aspects, and ignored their emotions which had formed barriers towards their learning.

On the other hand, outdoor education has traditionally emphasized on personal and social education of pupils through outdoor activities which often "involve some degree of risk, making physical demands on pupils" (Smith, 1987, p. 210). The tenets of its branch, adventure education, are "using experience to enhance the educational process, building moral character, and developing a willingness to take risks" (Wurdinger, 1995, p. 1).

Smith (1987) argues that geographical and outdoor education have a harmony of purpose. However, geography teachers often under-value what they do in geography teaching, and they are not aware of fieldwork's potential value in learning when it is done well and in a heuristic fashion. To him, the purpose of geographical education is much more than academic inquiry:

> We should not be too modest to explain the benefits of a geographical education, to show how they may contribute to other dimensions of education which we believe are worthwhile, and which may be the long-lasting agencies of personal and social development. (p. 214)

Recently, more geographical educators have argued for the need to attend to both the cognitive and the affective aspects of fieldwork in geographical and environmental education (Job, 1996; Slater, 1996).

The present study reports geographical fieldwork in a secondary school in which the teachers have focused on pupils' affective learning through engagement in adventurous activities. It is an experientially-based study which aims at understanding the fieldwork experiences of both students and teachers and what meanings they have derived from such experience (see also Lai, 1996a; Lai, 1996b).

2. RESEARCH CONTEXT

This study is a qualitative case study of the field experiences of Secondary Four (Year 10) students of a school in Hong Kong. It is part of an on-going research project on the fieldwork experiences of a broad range of Hong Kong secondary schools with different backgrounds and academic achievements. This case study adopts a multi-method approach in data collection: through interviews, participant observation and documentary evidence.

The school under study is a government-aided co-educational secondary school located near several old public housing estates in Kowloon. Its students are of mixed abilities. In the 1996-97 academic year, Mr. P was solely responsible for teaching geography in the two S.4 Arts classes, S.4A and S.4B. The latter was considered to be a relatively weak class academically.

Geographical fieldwork has been part of the school tradition for many years. In the year under study, S.4B went to the Bride's Pool area in northeast New Territories while S.4A took a boat trip from Sai Kung Town to Rocky Harbour. Bride's Pool is popular for study of rocks and stream erosional features. The Rocky Harbour area is noted for its erosional coastal landforms formed by strong wave attack on the columnar-jointed volcanic bedrock. Mr. P was assisted by his colleague, Miss W, in the field trips.

3. DESCRIPTION OF FIELDWORK EVENTS

The learning processes in both trips were similar. Mr. P held the briefing sessions one or two days before the trips, during which he informed the students the logistical arrangements. On the coach to the field sites, Mr. P distributed to each student a one-page worksheet and an outline map. At each checkpoint, the students listened to the explanation by Mr. P, and filled in the blanks with names of physical features or processes.

Similar to field trips in the past years, adventurous activities were included in both trips. In the Bride's Pool trip, Mr. P led his students to the base of a waterfall where he gave an explanation of its formation. To the students' surprise, he challenged them to climb with him up the 40-metre high steep valley wall. All the boys and several girls followed him. However, nine girls and Miss W did not join them.

In the boat trip to Rocky Harbour, the students observed erosional landforms such as sea caves and cliffs. The sea turned rough as the boat left sheltered water. While some students stayed at the bow and seemed to enjoy the rise and dip of the ship, six or seven students vomited. On the advice of the captain, Mr. P agreed to turn back and aborted the plan to see the next checkpoint which consisted of some famous sea arches and stacks. On the return journey, the boat moored in calm water near a beach for half an hour.

4. FINDINGS AND DISCUSSION

Fieldwork as Fun and Enjoyment

The students were motivated by the opportunity to leave the perceived boredom of the classroom and go on field trips on a school day. They would like to see in the real setting the geographical features that they have learned in class. However, for them, field trips have a dual purpose – there was a prominent desire to have fun and play in the field trip. This perception was most prevalent for S.4B students.

I: What do you think a geography field trip is?
S4: The whole class followed and listened to the teacher on information about rocks, take photos, measure things etc.
S5: There is fun. Unlike lessons, there are some concrete objects for you to see.
S3: Chat and laughter. (BP/BS1S: 5/7)

'Caves' and 'Waves' - Fieldwork as Adventure

The teachers were determined to let their students attain unusual and memorable experiences by undergoing adventurous activities. Miss W was of the opinion that "real" fieldwork should include an element of risk.

> (The route in Bride's Pool) is not too dangerous, and at the same time, however, there are some minor difficulties on the route. The point is that if you took an easy route, students would not take the trip seriously. On the path leading to the Bride's Pool, there are some boulders which students would have to do some climbing, and they will form a deep impression. I prefer to choose a route with some difficulties, and it makes the trip more like a real field trip. (BP/BT2P: 2-3/7)

Mr. P acknowledged that his holding of slope climbs on the Bride's Pool trips over the years was on purpose and was aimed to enrich the community life of the students.

> I did it on purpose. ... I wanted to leave them a special experience. ... Besides, the climbing can also enrich their 'communal lives'. We have climbed that hill before; basically, I think it is safe. ... The main aim was to leave them some good impression. It had been a success in the past few trips. ... Students were thrilled about it; they talked about it a lot. (laugh) ... After half a year or one year, they might still talk about it. Even on the graduation dinner they still talk about it.

The adventure is also an opportunity to narrow the gap between the boys and the girls:

> If we see that the girls are unwilling to go (climbing), (Miss W) will take care of them. If they are willing, she will bring them as well. In fact, if the girls are willing to go, it is even better because the boys will have a chance to take care of the girls; their 'communal lives' would become richer. That's my intention. ... (BP/AT1S: 14/24)

Similarly, he also admitted that he had deliberately brought his students to areas of strong waves during the boat trip.

> Actually I deliberately brought them to places where the waves are strong. The components of the trip consist of not just the "cave", but also the "waves". ... You would come across these things too while you are on the sea in the southeast. While students were rolled on the boat, they would get a stronger impression. (SK/AT1S: 18/21)

Most students considered the climb up the valley wall or the boat trip exciting and challenging. For students who attended the boat trip, many described that they had felt 'high'. They were still joyful when they shared their experiences in the post-trip interview:

> S3: I found (the boat trip) very exciting and enjoyable.
> S5: I have never tried renting a boat and facing the open sea before. ... It was good to train our guts. We can also experience the power of the waves. It was so real and horrifying, which the teacher could not deliver in class. ...
> S2: It has increased my impression. You won't be just studying in a field trip. The excitement of the wind and waves will make a deep impression on you. (SK/AS3S: 19-20/39)

These experiences were not just perceived as personal ones, but as collective ones. It was more prevalent among the S.4B students on the Bride's Pool trip:

> I: What do you think of climbing up the hill?

S3: (laugh) Good, quite interesting.
S6: (laugh) Interesting ... I seldom climb this way.
S3: Climbing with a whole team.
S6: I had to follow the pace of the one in front. When I walk slowly, those at the back have to slow down. When the one in front walks slowly, I have to slow down as well. (laugh) (BP/AS1S: 5-6/28)

In summary, it seems that the deliberate adventures organized by Mr. P have worked for most students in terms of creating deeper impressions and memories. In the Bride's Pool trip, there was a communal spirit through the interaction between the teachers and the students and among the students during the walk and the climb. This was less evident in the boat trip.

Avoiding or Withdrawing from the Adventure

The results revealed that while most students generally felt excited and delighted over the challenge, a number of students decided to avoid or are left out of the experience. In the Bride's Pool trip, several girls did not join the climb up the valley wall. In the Sai Kung boat trip, a number of students appeared seasick and stayed in the cabin throughout the journey.

An interview of two of the girls on the Bride's Pool trip, Man-wai and Joe, has revealed that the reasons for their non-participation were both physical and socio-emotional. In retrospect, they felt happy that they had stayed behind so they did not have to join the climb. Joe had the following comments:

> I felt sorry for (my classmates). They had to leave along that (steep) path. [Man-wai agreed.] ... If I were one of them ... I would stand there pathetically. I did not want to walk that way, but I couldn't choose to go back through the original path for there was no one with me. (BP/AS2S: 29-30/33)

Self-esteem was another factor which had affected the students' intent to take part in the adventure. Joe acknowledged that she was conscious of her figure during the trip.

I: Would you join a field trip in the future?
J: If it were a different place and if the classmates went, then I would go. It's not that tiring; in fact, I was just being lazy.
I: Why?
J: Hmm. Because of my figure. I am fat and it would be tiring to walk. People would also mock at me. (BP/AS2S: 10/33)

On the Sai Kung boat trip, several students sat passively in the cabin. Pui-yee was seasick shortly after she got on the boat. She had a mixed feeling of being happy at a field trip and frustration at getting seasick.

> When I got on the boat I began to feel sick and listless. So I didn't pay attention through the trip, except at the first check point. (The trip) was...more or less the same as I'd expected. Quite good. I'd have found the trip more enjoyable if I hadn't felt sick. ... After the first (checkpoint), I started vomiting. Then I lost my mood because I was occupied with how much I would vomit. So I was not interested in looking around and would like to rest. ...(SK/AS2F: 17-18/30)

Intellectual vs. Emotional Engagement

Though the teacher emphasized on the "syllabus-relatedness" of the field trip, it was apparent that he was less concerned with academic learning than affective learning. He believed that self-initiated and 'complicated' tasks were inappropriate for Secondary 4 students and the prime aim of S.4 trips was for "exposure". Hence the students were also not required to do any preparation of an academic nature. The design of worksheets was remarkably simple and, unlike many schools, there was no project work after the field trip.

In spite of the overall enjoyment and excitement, most students were critical of the hectic schedule of the trips. Students of S.4B, who are of higher academic achievement, appeared to be more critical. Their frustrations were often related to academic learning – disappointment with the inadequate time for preparation before the trip and the lack of a collective learning atmosphere on the boat trip. They thought that time for the latter half of the trip could have been more productively used for learning if the teacher had better anticipated the early abortion of the journey due to strong waves. It seems that the adventurous field trip had been more effective in emotional engagement but less in the intellectual engagement of the students. There was a tension of purpose between academic learning on one hand, and fun and excitement on the other.

5. SUMMARY

For the teachers, fieldwork is not simply academic learning, but a new way of "communal life" in which teachers and students interact and develop interpersonal relationships outside the school routine. On this aspect, their objective is similar to a tenet of adventure education which is to use adventure as a vehicle to enhance personal growth (Wurdinger, 1995).

Students were generally actively and emotionally involved in the adventurous challenges during the trips. However, amidst the excitement, a number of students avoided or were compelled to withdraw from the adventurous experiences. The reasons were sometimes physical, as for students who became seasick on the boat trip, or socio-emotional.

The trips were also characterized by a tension of purpose between academic learning on one hand, and fun and excitement on the other. The learning styles of the students differed – while some were overwhelmed by the experience, some discovered that there was something lacking in their learning.

6. REFERENCES

Foskett, N. (1997). Teaching and learning through fieldwork. In D. Tilbury & M. Williams (Eds.), Teaching and learning geography (pp. 189-201). London: Routledge.

GA Sixth Form - University Working Group. (1984). The enduring purpose of fieldwork. Teaching Geography, 9(5), 209-211.

Job, D. (1996). Geography and environmental education: An exploration of perspectives and strategies. In A. Kent, D. Lambert, M. Naish, & F. Slater (Eds.), Geography in education: Viewpoints on teaching and learning (pp. 22-49). Cambridge: Cambridge University Press.

Kent, M., Gilbertson, D. D., & Hunt, C., O. (1997). Fieldwork in geography teaching: A critical review of the literature and approaches. Journal of Geography in Higher Education, 21(3), 313-332.

Lai, K. C. (1996a). Revisiting fieldwork: Difference between intention and practice. Geographical Education, 9, 44-48.

Lai, K. C. (1996b). Understanding student teachers' experiences of geographical fieldwork. In T. van der Zijpp, J. van der Schee, & H. Trimp (Eds.), Innovation in geographical education: Proceedings of Commission on Geographical Education, 28th International Geographical Congress (pp. 136-140). Amsterdam: Centrum voor Educatieve Geografie Vrije Universiteit Amsterdam.

Lonergan, N., & Andresen, L. W. (1988). Field-based education: Some theoretical considerations. Higher Education Research and Development, 7(1), 63-77.

McPartland, M., & Harvey, P. K. (1987). A question of fieldwork. Teaching Geography, 12(4), 162-164.

Slater, F. (1996). Values: Towards mapping their locations in a geography education. In A. Kent, D. Lambert, M. Naish, & F. Slater (Eds.), Geography in education: Viewpoints on teaching and learning (pp. 200-230). Cambridge: Cambridge University Press.

Smith, P. R. (1987). Outdoor education and its educational objectives. Geography, 72(3), 209-216.

Wurdinger, S. D. (1995). Philosophical issues in adventure education. (2nd ed.). Dubuque, Iowa: Kendall/Hunt.

IT IS THE QUESTION: TO DO GOOD RESEARCH AND TO DO RESEARCH WELL

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The new Dutch curriculum for students in the upper levels of secondary education consists of a general programme and four specific streams. Geography belongs to the stream Economics and Society. In this stream we find geography, history, economics and maths. Students in each stream have to make a master-piece at the end of their secondary education to prove their ability to do an interdisciplinary research project.

To focus on environmental issues is a good option for such a research project. Geography, history and economics can help to understand the changing environment. This paper focuses on research projects for geography, history and economics in Amsterdam and surroundings.

Reflecting on the work of students in these interdisciplinary research projects the research question at the start is one of the main problems to cope with. Students must learn to restrict themselves to clear and simple research questions and have to be trained in disciplinary conceptual frameworks before they can become insiders.

Key words :

Geography Teaching
Key Concepts
Environmental Education
Enquiry Skills
Research Questions
Interdisiplinary Learning

IT IS THE QUESTION:
TO DO GOOD RESEARCH AND TO DO RESEARCH WELL

Joop van der Schee

INTRODUCTION

Environmental issues are no longer "at the top of the hit parade" in the Netherlands. The attention dropped quite fast in the last decade. That is strange in a prosperous, small and densely populated country. Especially in the Randstad Holland with its concentration of cities, ports and traffic the balance between people and nature is in a state of great tension. Environmental pollution is going hand in hand with economic growth. The growth of industry, traffic and consumption causes a rise in noise nuisance and increasing air, water and soil pollution. To give one example: the building of the big underground Schiphol railway station many meters below sea-level causes a big problem for the region around the airport because the groundwork disturbs the soil structure in such a way that the soil in the region becomes brackish. Every region has its own balance of natural and human characteristics which can change in time through external or internal influences. The core business of geographers is the study of this balance. Environmental problems occur when the balance is disturbed. Geographers are amongst those who are well placed to analyse the integration of human and natural systems within and across borders, and by doing this they can stimulate environmental awareness (Van der Schee, 1993). Thinking about geographical and environmental education there are quite a lot of questions to ask. A very important question is how to help students to become aware of the vulnerable balance between man and nature? One way to do this seems to be to stimulate students to explore their world working out their own research projects. As the Chinese proverb is supposed to say: I hear and I forget, I see and I remember, I do and I understand (Kent, 1996). Active enquiry learning has to be an important part of the education process. This paper focuses on experiences with students' research projects in the context of the new curriculum of the Netherlands.

INTERDISCIPLINARY RESEARCH PROJECT

The new Dutch curriculum for students in the upper levels of secondary education (15 to 19 years of age) is quite a change. Some schools already started with this programme in September 1998, the others have to follow in September 1999. The main changes are:

* students have to do more subjects than before and the possibilities to choose subjects are restricted;
* the new programme consists of a general part, an optional part and a free part;
* there are new subjects like general science and culture & arts;
* students have to develop a wide range of skills;
* teachers will be more and more coaches in stead of instructors.

The optional part gives students a choice between four streams: culture and society, economics and society, nature and health, nature and technique. Geography is one of the four subjects in the stream economics and society. The other three are history, economics and mathematics. Students in each stream have to make a masterpiece at the end of their secondary education to prove their ability to do an interdisciplinary research project.
Students get eighty hours in the last year before the central final exams to make their masterpiece. The result can be e.g. a written research report of 15 pages followed by a verbal

presentation about the project. Doing a research project for one discipline is a well-known element in Dutch education. Integrating two disciplines is new. This compulsory interdisciplinary research project is one of the best elements of the new Dutch curriculum. Students are challenged to train enquiry skills and teachers are challenged to look beyond the frontiers of their own discipline. Most students like to work on a research project and invest much more time than the planned hours because it is something of their own. Of course the work is not easy but it is worthwhile. Teachers are challenged too. Most teachers are individual workers. Interdisciplinary research projects require a co-ordinated approach of teachers. Normally geography teachers do not have to explain their work to colleagues. In interdisciplinary projects the classroom door is no longer closed. They have to justify the contribution of their discipline to society for colleagues as well as for students. Teachers must be keen on the complementary aspects of different disciplines. Geography is more than locations, history is more than dates and economics is more than money, but what exactly? Good materials for a co-ordinated approach of geography and history are shown in figure 1. It gives geography and history's unique contribution to the curriculum according the Qualifications and Curriculum Authority conference 'Geography and history in the 14-19 curriculum' (QCA, 1998).

Students study and learn about:	real places and environments throughout the world (geography) and real people and events in the past (history)
Students are helped to:	understand the interconnected nature of people, places and environments at all scales from local to global (geography) and understand the past and the forces which have shaped their lives, the lives of others and events in the contemporary world (history)
Students develop:	personal and social skills, including tolerance of other people and other cultures, sensitivity to issues about people and place and the ability to handle moral dilemmas in a responsible way
Students learn to use:	a wide range of critical enquiry skills, including abilities to pose relevant questions, find and use varied sources of information, handle evidence, think analytically, make decisions and communicate argument and findings

Figure 1: Geography and history's unique contribution to the curriculum (QCA, 1998)

SOME EXPERIMENTS REGARDING RESEARCH QUESTIONS

In 1998 an experiment was started at the Free University in Amsterdam to get an idea of the perception of students about working on a interdisciplinary research project. One hundred students from three schools for secondary education (15 to 19 years of age) in and near Amsterdam participated in this experiment. Every student had to develop a research plan for an interdisciplinary project including a theme, a main question, two subquestions, expectations and a planning. Having done this students completed a questionnaire about the degree of difficulty they had experienced in performing the different parts of the research plan. Table 1 shows the results. Above all students find it difficult to formulate a good research question.

The sting is not in the tail but in the start. Without a good start there can not be a good research project. So it is very important to train students in formulating good research questions. But what is it the problem exactly?

TABLE 1: PERCEPTION OF STUDENTS REGARDING DIFFERENT ELEMENTS OF AN INTERDISCIPLINARY RESEARCH PROJECT (N=100)

Element of an interdisciplinary research project	Difficult	Easy
Choose a theme	58%	42%
Formulate a central question	70%	30%
Combine two disciplines	54%	46%
Formulate two subquestions	59%	41%
Formulate expectations	53%	47%
Make a planning	48%	52%

To get a better idea of the problems that students have in formulating a research question a second experiment was started. Upper level students of two secondary schools in the region Amsterdam were asked to participate in an interdisciplinary research project in stead of a part of their normal school examination. The zest was great, although the alternative was not easy. The fifty students involved in the experiment worked with a handout comprehending a schedule for a plan of action, assessment criteria, etc. (Van der Schee & Lunenberg, 1998). Most of the students took a combination of history and geography, some a combination of geography and economics for their interdisciplinary work. Most students worked together with one other student, some worked alone. After an introduction about the organisation of the work, students were asked to make a plan of action. Examples of themes and research questions formulated by students are shown in figure 2.

Conclusions which can be drawn from this investigation are:

1. There must be one clear central question, for instance the words 'quite normal' in the first central question in figure 2 are too vague.
2. The link between the central question and the subquestions must be clear, for instance in the first case in figure 2 it is not clear how the history of marihuana influences the use of marihuana in the Netherlands
3. The research must be attainable seen the given time and resources, for instance the second case in figure 2 is too ambitious.
4. The input of both disciplines must be clear. This is not the case in the research proposition 'Ireland' in figure 2 where the input of geography is unclear. Some teachers argued that the input of history in the third case in figure 2 is unclear.
5. The conceptual structure must be clear as can be seen in the third case in figure 2 where students choose to investigate certain explicit relationships.

Students 1 and 2:

Theme	: Marihuana
Central question	: Why is marihuana quite normal in the Netherlands?
Subquestion 1	: Where does it come from? (history)
Subquestion 2	: What is the diffusion pattern of marihuana? (geography)

Students 3 and 4:

Theme	: Ireland
Central question	: What made Ireland to what it is now?
Subquestion 1	: What is the history of Ireland?
Subquestion 2	: How did Ireland develop geographically?

Students 5 and 6:

Theme	: The new borders of the former Soviet Union
Central question	: How are the borders of the former Soviet Union defined?
Subquestion 1	: Is there a relationship between the nature of the groups of the population and the new borders? (history)
Subquestion 2	: Is there a relationship between the nature of the areas involved and the new borders? (geography)

Figure 2: Some examples of concept plans of action for interdisciplinary research projects of students from a upper level secondary school in Amsterdam.

DISCUSSION

To do research well starts with formulating good questions. There is still a way to go in this field not only for students but also for teachers. Most teachers involved in the reported experiment did not use the five points mentioned above systematically. A separate experiment proved that also an other group of teachers was not able to formulate good research questions for interdisciplinary research projects themselves. So it is not surprising that students in secondary education wrestle with the wording of good research questions. Even many university students have problems with it. It seems useful to train students in secondary education from the start in formulating questions for simple research projects. But above all Dutch teachers should follow an in-service training on this issue.

To do good research is another point. Which issues are vital in life? Crabb (1996) thinks water is central to geography: "Water, more than anything else, demonstrates the interdependence of the physical and human environments. Because water is essential for all life and virtually every human activity, it is central to the study of the planet Earth as the habitat of all living things". It is desirable to focus on environmental issues like this? Huckle (1993) argues that education for sustainability is important: "Environmental geography requires pupils to demonstrate their increasing knowledge and understanding of the use and misuse of natural resources, the quality and vulnerability of different environments and the possibilities for protecting and managing environments". Are students free to choose the theme of their research project? Not completely. Teachers should discuss students' propositions for interdisciplinary research projects. In such a conversation the core business of both disciplines can be discussed. A certain issue in which a student is interested will be

confronted with the disciplinary view of the teachers in two subjects. There is a good basis for an interdisciplinary research project if teacher and student do agree on geography and history as subjects that focus on people and their activities in regions which have a balance of natural and human characteristics and which change in time through external and internal influences.

The research project described just started. It seems to be promising as it hits some essential educational issues as enquiry learning and interdisciplinary education. Development of skills can not be seen apart from the development of central ideas in geography, history and environmental education. Further research is necessary to get a better idea about teachers' and students' enquiry skills in relation to disciplinary key concepts.

REFERENCES

Crabb, P. (1996) Water: Confronting the critical dilemma. In I. Douglas et al. (eds.) *Companion Encyclopaedia of geography. The environment and humankind*. London: Routledge, 526-553.

Huckle, J. (1993) Environmental education and the national curriculum in the United Kingdom. *International Research in Geographical and Environmental Education*, 2 (2): 101-104.

Kent, A. (1996) A strategy for geography fieldwork. In J.A. van der Schee et al. (Eds) *Innovation in Geographical Education*. NGS 208. Amsterdam: Vrije Universiteit, 167-178.

Schee, J.A. van der (1993) Geography teaching and environmental education - a Dutch perspective. *International Research in Geographical and Environmental Education*, 2 (2): 113-115.

Schee, J.A. van der and Lunenberg, M. (1998) *Het profielwerkstuk*. Leerlingendeel en docentenhandleiding. Amsterdam: IDO/VU.

QCA (1998) Geography and history in the 14-19 curriculum. *Teaching Geography*, 23 (3), 125-128.

FINNISH-NW RUSSIAN ENVIRONMENTAL EDUCATION IN ST. PETERSBURG: THE STARTING PHASE OF AN ACTION-RESEARCH PROJECT

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This paper describes the initial phase of an action research project, which aims at developing the environmental education practices of chosen children's creativity centres and schools of the St. Petersburg area. The endeavour is based on the presumption that the cyclical process of combining practical action like methodological courses with critical discourse provides an effective means of empowering teachers to take action for a better environment. A participatory approach is aimed at, despite the geographical and cultural distance between the research partners.

The project started in 1997 at Helsinki University, Finland, with a pre-survey about the historical background and state of environmental education in North-West Russia. Contact-making sessions were arranged in St. Petersburg in September and in November 1998, the latter resulting in a survey of the needs and the hopes of the partners in both countries. The project design was outlined in Finland and revised jointly at the end of the first practical education and research process, which took place in St. Petersburg in January 1999 in the form of a four days' course in intensive drama-based environmental education.

E-mail correspondence and written notes from the project meetings are available as research data since September 1998. Data from the January process was collected by non-participant observation, sonar taping and diaries written by all participants. One day retention of some course material was also tested. Analysis of these data and the third version of the project design are discussed.

Key words :

Action research
Intensive drama-based environmental education
Schools
Russia
Finland

FINNISH-NW RUSSIAN ENVIRONMENTAL EDUCATION IN ST. PETERSBURG: THE STARTING PHASE OF AN ACTION-RESEARCH PROJECT

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1 INTRODUCTION

Russia is widely known for its huge environmental problems, a situation that has bothered us in the Department of Geography and at the Department of Education of the University of Helsinki, Finland. In 1997 we started a project, *Finnish-NW Russian Environmental Education Development and Research Cooperation*, with a survey by Helanterä et al. (1998). The theoretical framework and the goals were outlined as follows:

1. Offering Russian teachers a possibility to take part in environmental education in Finland and/or in courses given by Finnish environmental educators in Russia.
2. Offering Finnish teacher educators a possibility to get acquainted with environmental education methods used in Russia.
3. Studying the needs and preconditions of educational cooperation as well as studying the progress and results of such cooperation while it is carried out.
4. Producing jointly environmental education materials relevant for both countries.

A more specific formulation of the research problems was left to be done with Russian colleagues, since participatory action research was considered to be the most relevant approach, meaning that the process itself should influence the problem setting (cf. McNiff, 1995; Hillcoat, 1996).

2 THE CONTACT PHASE

The second forum, *Our Common Environment*, in September 1998, arranged in St. Petersburg by the Finnish Ministry of Environment and the City of St. Petersburg, greatly facilitated contacts with Russian educators. Two partner institutions were chosen from several which were interested. At the end of November 1998 four of us met our partners in St. Petersburg during a two-day visit to discuss the possible fields of cooperation. Getting acquainted with each other and communicating our expectations was fundamental for a common strategy to be devised. A one-day visit to each institution convinced us that our partners are highly devoted and experienced professionals who use a variety of Russian and Western teaching methods.

The *Children's Ecological Centre in Admiralteiskaja Region* is situated in central St. Petersburg. About 600 children and 15 teachers form this centre, which exemplifies numerous corresponding institutions for voluntary additional education all around Russia. After their normal schoolday children visit the centre voluntarily in order to learn more about ecological and environmental issues.

School no. 466 is situated in Kurortnaja region, a northern suburb of St. Petersburg. The school has 627 students aged 7-16, and personnel of about 50. Besides normal school activity, there are two special institutions operating in the school building, namely, The *Children's Ecological Centre in Kurortnaja Region* and the *Pedagogical Centre in Kurortnaja Region*, both taking care of the extracurriculum teaching of children after their normal schoolday. In addition, excursions and summer camps in nature are arranged .

3 HOPES AND EXPECTATIONS

To ensure the relevance of the project´s future work, the teachers and school headmasters were asked at the end of our visit to comment upon (a) the state of their local, regional and national environment, (b) the possibilities of meeting environmental challenges pedagogically and (c) their hopes for, and expectations of, the project. In addition, we all wrote what we could learn from each other.

The educators were most concerned about the traffic - air pollution complex. Bad waste management was also regarded as a sevère problem both locally and regionally. Water pollution was mentioned as a difficult problem throughout Northwestern Russia. Environmental education was regarded as an appropriate tool in dealing with these problems, providing the means to empower students to act. Thus the developmental level of the students should be carefully considered in planning.

The Russians expected to learn from the Finns new teaching methods, student-teacher interaction, and qualities like punctuality and carefulness. Finns, on the other hand, were by the Russians supposed to learn from their approach of scientific problem-solving, student participation in projects, and how the affective domain of each student is taken into account.

Personal relations and concrete cooperation, where children are directly involved, were mentioned most frequently by our Russian partners as their expectations of the project. Meeting the latter wish was seen complicated by the Finnish group, consisting of teacher trainers only. To initiate this practical cooperation it was decided that the Finns would teach a course based on Intensive Drama-Based Environmental Education, arranged for the whole group by the Children´s Ecological Centre in Admiralteiskaja Region at the end of January 1999.

4 ACTION IN ACTION

IMEK (Intensive Method for Ecological Education), or Intensive Drama-Based Environmental Education, has been developed at the University of Helsinki (Lappalainen, 1994) on the basis of suggestopedia (Lozanov, 1979; Lozanov & Gateva, 1988), widely known for its numerous applications in both Finland and Russia (Kitaigorodskaya, 1991). Applying the suggestopedic principles (eg. self esteem, positive affective atmosphere, music and relaxation, concert pseudo-passivity, doubleplaneness and liberation of the unconscious reserves of the human mind), IMEK has adopted methods for social activation from pedagogical drama (e.g. Neelands, 1990; Owens & Barber, 1997) and NLP.

Thirteen teachers participated. Reflective diaries were written daily by everyone, using O'Hanlon´s analysis (1997). The last diary was to be written two weeks after the course. The second day of the three-day course started with a teaching demonstration on the defoliation of coniferous trees, exemplifying the suggestopedic cycle which includes *prelude*, where the first role contract is made, one or two *concert(s)* for feeding the subject matter and a *series of social activations* for developing and applying the subject matter. The course ended at the participants' own cycles by groups of two or three, using the suggestopedic teaching material on the theme IMEK. The main observations of the course and conceptualization thereof resulted in five categories, explained below.

Inevitable preconditions

An integral part of cooperation in practical work is the relevance for both participants of what actually is done together. What are the others already good at? In which areas do they want to improve their professional skills? Planning and practical arrangements deserve special attention. The role of a devoted interpreter is essential. The interpreter not only translates, but also builds up a "cultural bridge" between the action-research partners, as noticed, e.g., by Otto & Nkanga (1995). Frequent telephone calls were needed for keeping both partners informed about actions planned and made. These included cooperation contracts, course diplomas and other course materials, research handouts and returned questionaries, etc.

Atmosphere and interaction

According to diaries, some participants were fairly confused about the method after the first day. However, everyone found the atmosphere very open and friendly. The diaries were positive:

> "During this celebration we formed a real team of companions."
>
> "I didn´t expect my colleagues to have such a great sense of humour, such an enormous ability to act. My opinion, that we can make it, was strengthened."

Perhaps only the teacher — having more than ten years of experience in the method — was not surprised at the emergence of an elated atmosphere. The good feelings helped to overcome situations during, e.g., seat work, when assignments could be understood differently by different groups. Mediating instructions by an interpreter makes extra demands on the course teacher. Interpreting too sometimes leads to misunderstandings. Scientific teaching material, especially, puts the interpreter's skills and endurance to the test. Long instruction or interpretation discernibly affected the activity of the group, and working was not so concentrated. On the other hand, if the participants did not understand something, they often asked about it right away. Openness like this was very stimulating for the teacher.

Learning outcomes

The course was clearly a success. It was fortunate that several teachers had already used elements of the method in their own teaching. Although parts of it were familiar, the method as an unifying program was a new experience:

> "With IMEK I can gather loose pearls into a necklace. Many pearls I've already used in my work. The IMEK method appeals with its flexibility, versatility and emotional emphasis. Role playing is impossible without emotions involved "

Exercises containing active elements or drama interested the Russian teachers most. Everything new that can be used in classrooms — like the creative use of pictures, which is typical for suggestopedic material — raised attention. The last day was a climax: a chance for the Russian teachers to show what they had learned. The drama/suggestopedic learning cycles they had prepared were a joy to watch! They combined suggestopedic and drama elements in new creative ways. During the last day many reflective and critical discussions took place: the teachers were obviously still working on a deeper understanding of the method.

Openness to teaching innovations

Will IMEK have a future in St. Petersburg? According to the diaries: yes.

"Two weeks have passed and my impressions have been strengthened. I constantly reflect on how to use this method (IMEK) in my classes/work."

The Russian teachers were spontaneous and open to new ideas. They oriented themselves quickly but did not adopt things without critical reflection and questioning. They quickly found out, that the method requires a lot of initial work from the teacher. It may also take time away from other, more knowledge-based lessons. It is thus easier to adopt in the ecological centers than in schools. Despite the "language barrier" our colleagues soon came up with ideas on how to develop the method to suit their own needs.

5 IDEAS AND FUTURE HOPES

Many spontaneous suggestions were made by the Russian participants regarding the future:
— Giving lessons using both IMEK and traditional methods, and then making inquiries to find out which method was preferred by the pupils.
— Organizing the production of classroom learning material for IMEK.
— Producing written material, each teacher on a chosen subject, preferably concerning environmental issues that are widely discussed right now.
— Inviting Finnish environmental educators working with Earth Education programs
— Displaying to us during our next visit the lessons and teaching material they have prepared.
— Publishing articles about environmental education in Russia in Finnish journals.

The Russian partners also expressed a wish to have another IMEK course. We agreed to organize one in March 1999. The course will be video-recorded. Further, the Russian partners invited the Finnish partners to a pedagogical conference they will organize in St. Petersburg in April 1999. There will be a section for IMEK. The visit of the Russian teachers to Finland, an integral part of the project, was also discussed. In our research cooperation it is important that both partners get to know about environmental education practices in both countries.

6 DISCUSSION

It was empowering for both sides to meet colleagues from the neighbouring country. The environmental problems started to appear more manageable. Obviously the safety-enhancing basic principles of the Lozanov method created an atmosphere of self-esteem and friendship which helped us to overcome the barriers of language and culture. The practical elements like activation, visuality and learning styles added to the air of joy, learning and empowerment. Our colleagues took part in drama and playful excercises more openly and willingly than the Finnish teachers would. Was it so because in Russia the teacher is still more of an authority and teaching may have a more "official" nature? In the main, teaching and learning cultures in Russia seem to differ from those in Finland. Competition and quizes were said to be an integral part of teaching practises in Russia. Organizing a quiz around the subject at hand is a sure way to get everybody´s attention!

Is the difference in teaching styles also the reason why Russian educators generally talk about ecology education, not about environmental education? Or is environmental education in Russia really only dealing with ecology? According to Tarasova (1994), environmental education in its western meaning does not exist there, but has always been conducted as part

of science education. Our experiences , however, give a somewhat different picture. Handling moral and ethical issues and influencing the pupil´s attitudes through environmental education occupies teacher´s minds in both countries. We had a couple of good discussions on these issues, and learned that they contain a very strong emotional charge in Russia as in Finland. Both cooperation partners agreed that pupils should absolutely not be made to feel guilty for environmental problems, but to adopt a positive, active and forward-looking attitude.

Environmental education in Russia has, indeed, its roots in science, but after the years of Perestroika, much has changed, as indicated by works like those of Karjakina (1998) and Kezin (1998). Perhaps international contacts are a new factor widening the concept of ecological education. For many Russians ecological education seems to mean the same thing as environmental education does for their western colleagues (Hungerford & Volk, 1990; Palmer, 1998). Yet, our experiences are from institutions which have had lively contacts with western countries during the last years. Since these institutions are responsible for teacher education, we conclude that ecological education is about to move in the direction of ethical and moral education.

7 REFERENCES

O'Hanlon, C. (1997) The professional Journal, Genres and personal Development in Higher Education. In S. Hollingsworth (ed) *International Action Research*, p. 172-173. London: Falmers Press.

Hillcoat, J. (1996) Action Research. In M. Williams (ed) *Understanding Geographical and Environmental Education*, p. 149-161. London: Cassell Education.

Hungerford, H. and Volk, T. (1990) Changing Learner Behaviour Through Environmental Education. *Journal of Environmental Education* 21 (3): 8-21.

Karjakina, N. I. (1998) Opyt ispolzovanija emocionalno-tshuvstvennogo podhoda v praktike ekologitsheskogo obrazovanija. *Ekologia i obrazovanije*. No. 1, p. 42-44.

Kezin, V. (1998) *Formirovanie ekologithseskoj kultury litshnosti mladshih podrostkov v pedagogitsheskom processe shkoly sredstvami musikalnogo iskusstva.* Moscow.

Kitaigorodskaya, G. (1991) Suggestology in the USSR. *Journal of the Society for Accelerative Learning and Teaching* 16 (1): 3-18.

Lappalainen, A. (1994) Suggestiopohjaisen pedagogiikan kurssi osana opetusharjoittelua. In H. Rikkinen and S. Tella (eds) *Kunne johtaa tieto ja tunne*. Studia Paedagogica, No. 3, p. 183-191. Helsinki: Yliopistopaino.

Lozanov, G. (1979) Accelerated Learning and Individual Potential. *Prospects: Quarterly Review of Education* 9 (4): 14-25.

Lozanov, G. and Gateva, E. (1988) *The Foreign Language Teacher´s Suggestopedic Manual.* New York: Gordon and Breach Science Publishers.

Neelands, J. (1990) *Structuring Drama Work.* Cambridge, New York and Melbourne: Cambridge University Press.

McNiff, J. (1995) *Action Research: Principles and Practice.* New York: Routledge.

Otto, A. and Nkanga, S. (1995) Doing Educational Research: an action research approach. *Educational Action Research* 3 (3): 279-286.

Owens, A. and Barber, K. (1997) *Dramaworks.* Carel Press.

Palmer, J. (1998) *Environmental education in the 21st century.* London: Routledge.

Tarasova, N. (1994) The character of Russian environmental education. *International Research in Geographical and Environmental Education* 3 (2): 65-67.

ADAPTING THE GEOGRAPHIC AND ENVIRONMENTAL EDUCATION MODEL TO ENGINEERING AND TECHNICAL EDUCATION

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The paper treats the importance of educating engineering and applied science students in human-environment interactions, adapting the "man-land" model that has been at the heart of geographic education, and later, environmental education, since their beginnings. Engineers and applied scientists--those whose professions put them squarely in the "business" of transforming the face of the Earth--should be informed both about the biosphere and the interconnectivity of human systems and environmental systems. This argues for a new, more holistic approach to teaching the humanities and social sciences at engineering and technical institutions. Though such a holistic approach is the hallmark of geographic and environmental education, this has not been the case at technical institutions which provide extraordinary depth at the expense of comprehensive and integrative breadth.

David W. Orr has argued that "We must recognize that all education is environmental education...that students are taught in various and often unintended ways that they are part of, or apart from, natural systems." (Change, v. 27, n. 3, May/June 1995) The structure of engineering education, unlike geographic or environmental education, inadvertently teaches that we are "apart from natural systems". In order to prepare technical students for the world they inhabit and which they help design and shape, we must provide a liberal education that adapts the geographic and environmental education model.

This paper will use the approach of the Colorado School of Mines as a case study to devise a liberal education for technical students that is modelled on integrative geographic and environmental education.

Key words :
Human Environment Relations
Environment
Technical Education
Curriculum Design

ADAPTING THE GEOGRAPHIC AND ENVIRONMENTAL EDUCATION MODEL TO ENGINEERING AND TECHNICAL EDUCATION

Arthur B. Sacks and Hussein A. Amery

INTRODUCTION

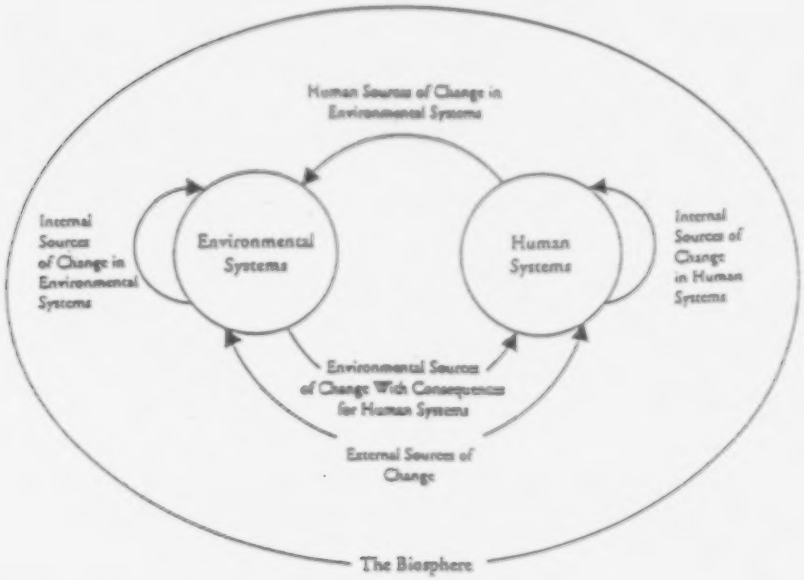
A recent UNESCO framework for change in education states that institutions of higher education should use "their autonomy and higher academic standards to contribute to the sustainable development of society" and pay special attention to, among other things, "fundamentals of human ethics, applied to each profession, and to all areas of human endeavour" (1998). UNESCO's focus on education for sustainable development builds upon the past thirty-five years of discussion and debate by interdisciplinary and multidisciplinary groups of scientists, engineers, social scientists and humanists on the subject of "How Should We Treat the Environment?" (Hare, 1970). This debate is still on going, but over this period it has produced remarkable innovation in university mission statements, in university structure and organization, and in the general or core curriculum as well as specialized education (Caldwell, 1966, 1985; Steinhart and Cherniak, 1969; Hare, 1970; Bryson, 1976; Odum, 1977; Wolman, 1977; Davis, 1978; Sacks, 1978, 1985; Cairns, 1980; Perrine, 1982; Collett and Karkashian 1996; Wiedenhoeft, 1999).

THE COLORADO SCHOOL OF MINES (CSM) CORE CURRICULUM

This debate and innovation in "education for sustainability"--an education whose roots lie in geographical education and in environmental education, which emerged from it--now pervades the entire higher educational world from community colleges, to specialized engineering and technical schools, to doctoral level universities. This debate has come to CSM, an undergraduate and graduate technical institution founded in 1874 to prepare engineers and applied scientists in the exploration, extraction, refinement, and application of mineral and energy resources, and which now additionally prepares civil, electrical, mechanical, and chemical engineers, environmental scientists and mineral economists. The School has redefined itself as "an academy for the stewardship of the Earth" (Schowengerdt, 1993). As such, CSM has taken the lead among U.S. technical institutions in recognizing the profound, Earth-transforming roles of engineers as they design and apply technologies to improve human health, safety and welfare.

CSM has developed a new humanities and social science (H&SS) undergraduate core curriculum which, adapting Orr's words, recognizes "...that all education is environmental education...", by which he means that "...students are taught in various and often unintended ways that they are part of, or apart from, natural systems" (Orr, 1995). The focus of this core curriculum is "human-environment interactions, including knowledge of how engineering responsibilities extend to consequences for human society and the rest of life on Earth" (CSM, 1997). It is designed to underscore the reality that humans and their social and cultural systems are inextricably "part of" natural systems. Figure 1 provides a schematic of the interrelation of environmental systems and human systems that this curriculum explores. The curriculum is also designed to enable students to investigate the meaning and implications of "Earth stewardship" and "sustainability" as well as the inherent ethical responsibilities of engineers and applied scientists, individuals whose *business* is to change the face of the Earth.

Figure 1
Human-Environment Interactions


Human Sources of Change in Environmental Systems
Internal Sources of Change in Environmental Systems
Environmental Systems
Human Systems
Internal Sources of Change in Human Systems
Environmental Sources of Change With Consequences for Human Systems
External Sources of Change
The Biosphere

(After Clark et al. 1988)

In pursuing this direction, CSM has attempted to correct deficiencies in contemporary liberal arts education, which has largely failed to integrate the study of human systems with the study of natural systems. In doing so, CSM builds upon Clark's notion that: "The goal of liberal education must be to free ourselves from the falsehood of individual disconnectedness, from the myth that we are separate and discrete beings entitled to conduct our lives without an awareness of how we are affected by other parts of the universe and without regard for how we affect them. The central objective...must be to enable us to connect with each other, with others more distant in time and space, with sources of information, with technologies, and with the whole of the natural world" (Clark, 1997). CSM would argue that people are "entitled" to conduct their lives without the awareness Clark speaks of, but a liberal education, particularly a liberal education component for engineers and applied scientists, should not be designed to promote the lack of such awareness.

GEOGRAPHICAL EDUCATION AS A MODEL

In this paper, we treat environmental education as a conceptual offshoot of geographical education. It should be clear, however, that unlike geographical education, environmental education broadly defined, is inherently *interdisciplinary* and *problem focused*, and explores human-environment interactions with an eye towards understanding these interrelationships in order to *solve* complex problems. Ultimately, environmental education has a decidedly utilitarian goal: to develop the perspectives and the capabilities required to establish policies and behavioral changes that will eliminate or ameliorate human-induced environmental threats to the natural systems upon which humans and all biota depend. Geographical education, on the

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other hand, investigates human-environment interactions--"man-land relations" in an older phrase--but does so from the disciplinary perspective of geography, and does so for its own sake, and not necessarily as a driver for cultural/behavioral change or policy formulation for the solution of contemporary environmental problems. Nevertheless, geography is clearly the progenitor of environmental education. It is largely the field of geography, informed by the urgency and practical problem-solving orientation of environmental education, that has been the model for the innovations in liberal arts education at CSM.

Geography literally means "description of the Earth's surface," from the Greek geo, the earth, and graphein, to write (Johnston et al., 1988). Geography is the study of the dynamics of spatial relationships and interactions on the Earth's surface that give character to places and regions. Geography is thus concerned with the description and interpretation of the variable characteristics of Earth's surface that form the habitat or environment within which the human population is able to live. It is also concerned with the interrelations of different kind of phenomena that are directly or indirectly tied to the Earth, the distinctive character of these phenomena, and the structures they form in different areas of the Earth (Hartshorne, 1939). "Humans and environment in interaction; the patterns of distribution of natural phenomena affecting human use of the earth; the cultural patterns of occupance and exploitation of the physical world" are the main themes of geography (Getis, Getis and Felmann, 1994). Consequently, human-environment interaction is the fundamental organizing principle in geography. It also forms the conceptual basis of the H&SS core at CSM consisting of the freshman course "Nature and Human Values," and two sophomore level courses, "Human Systems" and "Principles of Economics."

Johnston et al. (1988) and Getis, Getis and Felmann (1994) point out that the defining features of geography are its emphasis (1) on locational or spatial variations in the Earth's physical and human phenomena which geographers represent through the use of maps; (2) on relations between people and the land, people's impact on the land, and the land's impacts on humans; and
(3) on the human-devised region, designed to bring intellectual order to the immense variability of the Earth's surface. Getis, Getis and Felmann (1994) argue that "geographers must view places as the present result of past operation of distinctive physical and cultural processes". As individuals face the challenge of living, they replace or modify the natural environment. Consequently, geographic analysis of society starts with people in specific places. These people use the natural resources in their area (and eventually those beyond it) within their active framework of culture. The cultural dimensions of geography examine peoples' ideas and values which underlie their decisions and peoples' ability to innovate, adapt and adopt new ideas and technologies as they conduct their activities in the natural world.

CONCLUSION

Although much more can be said about the discipline of geography, the above reveals the fundamental emphasis geography places on the interrelationship of people --their physical characteristics and cultural attributes--and place. If people inherently "change then face of the Earth" (see Thomas et al., 1956; Simmons, 1989; Turner et al., 1990; and Goudie, 1990) by virtue of their very existence, professional engineers and applied scientists do so by design. As such, they have a special ethical responsibility to be mindful of the environmental systems they perturb. In like manner, higher educational institutions which prepare people for these professions, have a professional and ethical responsibility to educate students about the interface

of human and environmental systems. Since geography is the field which focuses upon human-environment interaction, CSM has adapted the geographical education model--and elements of the environmental educational model which has emerged from the field of geography--in its design of an H&SS core curriculum. In doing so, CSM has advanced both technical education and liberal education at a time when environmental problems abound and human ingenuity has the ability to further exacerbate or to resolve them.

REFERENCES

Bryson, R. A. (1976). The Environment, The University & The Future. Speech of 9 February 1976, Texas Tech University, Lubbock, Texas.

Cairns, J. Jr. (1980). Beyond Reductionism *Observation: The Virginia Tech Magazine*, 3 (1): 31-32.

Caldwell, L.K. (1966). The Human Environment: A Growing Challenge for Higher Education, *Journal of Higher Education*. 37 (2): 149-155.

_____. (1983). Environmental Studies: Discipline or Metadiscipline? *The Environmental Professional*, 5(3): 247-259.

Clark, C.W. et al. (1988) *Toward an Understanding of Global Change*. New York: National Academy Press.

Clark, R. P. (1997). *The Global Imperative*. Westview Press.

Collett, J. and Karakashian, S. Editors. (1996) *Greening the College Curriculum*. Washington, D.C.: Island Press.

Colorado School of Mines. (1997) Final Report of the Humanities and Social Science Reform Subcommittee, 6 June.

Davis, C. B. (1978). Interdisciplinary, Problem-Focused Environmental Studies, *Current Issues in Environmental Education I*, (December): 130-136. Edited by Craig B. Davis and Arthur B. Sacks. Columbus: The Ohio State University.

Hare, F. K. (1970). How Should We Treat the Environment? *Science* 167: 352-355.

Hartshorne, R. (1939). *The Nature of Geography: A Critical Survey of Current Thought in Light of the Past*. Lancaster, Pa.: Association of American Geographers.

Huntington, E. and E. B. Shaw. (1951). *Principles of Human Geography*. New York and London: John Wiley and Sons.

Johnston, R.J. (1988). *The Dictionary of Human Geography*. 2nd edition. Oxford: Blackwell.

Getis, A., Getis J., and J. Felmann. (1994). *Introduction to Geography*. 4th edition. Dubuque, Iowa and Oxford, England: Wm. C. Brown Publishers.

Goudie, A. (1990). *The Human Impact on the Natural Environment*. Cambridge, Mass: The MIT Press.

Odum, E. P. (1977). The Emergence of Ecology as a New Integrative Discipline, *Science* 195: 1289-1293.

Orr, D.W. (1995). Educating for the Environment: Higher Education's Challenge of the Next Century, Change, 27(3), May/June.

Perrine, R. L. (1982). TSCA and the Universities: Educating the Environmental Professional, *The Environmental Professional*, 4(2): 187-200.

Sacks, A. B. (1978). The Undergraduate Environmental Studies Curriculum: Developments Within the Liberal Arts Tradition, *Current Issues in Environmental Education IV* (December) 137-140. Edited by Craig B. Davis and Arthus B. Sacks. Columbus: The Ohio State University.

_____. (1985). The Organization of Environmental Studies in the University: A North American Perspective. Presentation at the Third International Conference on the Nature and Teaching of Environmental Studies and Sciences in Higher Education Sunderland, U.K.

Schowengerdt, F. D. (1993) State of the Academy Address, January, Colorado School of Mines, Golden, Colorado.

Shaw, E.B. (1965). *Fundamentals of Geography*. New York: John Wiley.

Simmons, I.G. (1989). *Changing the Face of the Earth*. Cambridge, Mass.: Blackwell Publishers.

Steinhart, J.S. and Cherniak, S. (1969). *The Universities and Environmental Quality--Commitment to Problem Focused Education: A Report to the President's Environmental Quality Council*. Washington, D.C.: Executive Office of the President, Office of Science and Technology.

Thomas, W. L. Jr. editor. (1956). *Man's Role in Changing the Face of the Earth*. Chicago: University of Chicago Press.

Turner, B. L. II et al. (1990). *The Earth as Transformed by Human Action*. Cambridge University Press.

UNESCO (1998). *Higher Education in the Twenty First Century: Vision and Action*. Draft Framework for the Priority Action for Change and Development of Higher Education. ED-98/CONF.202/3 Prov.Rev.3.

Wiedenhoeft, R. (1999) Ecology and Engineering: Changing Paradigms, *Journal of Engineering Education*, January , 1-4.

Wolman, M.G. (1977). Interdisciplinary Education: A Continuing Experiment, *Science* 198:800-804.

GEOGRAPHY'S CURRENT AND FUTURE ROLE IN ENVIRONMENTAL EDUCATION: A NEW ZEALAND PERSPECTIVE

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Effective environmental education is essential to ensure informed community support for the policies, programmes, and practices that will bring about sustainable development in New Zealand. To this end the National Strategy for Environmental Education published in June 1998 seeks the effective "incorporation of the aims of environmental education across the school curriculum" as one of its six priorities.

This paper investigates the special characteristics of environmental education and points to geography's competitive advantage in this area before looking at some leading New Zealand educational practitioners' perceptions of the opportunities for environmental education offered by geography in the Social Science learning area on the national curriculum framework. The focusing questions and the related important geographic ideas used in senior (years 11 to 13) geography are analysed for the content of the common key words/ideas relating to environmental education identified by the interviews.

This paper confirms the findings of an earlier Auckland research report (Chidlwo, 1997) that New Zealand geography (like other school subjects) teaches 'about' and 'in' the environment, but generally omits learning 'for' the environment. A case is made for the need for the urgent revision of the geography syllabus; in particular the wording and focusing questions of each 'prescribed common topic' to incorporate current thinking. This is related to the use of 'important geographic ideas'.

Suggestions for change refer to environmental education guidelines and resource inventories currently being produced by the Ministry for the Environment, as well as discussion about the place of digital technologies in the geography curriculum. Emphasis is placed on the importance of building partnerships with higher education and with local and central government agencies.

Finally, recommendations are made for incorporating Resource Management Act principles and processes into the geography curriculum. References to local case studies provide illustration of the resource consent process, cost-benefit analysis, the precautionary principle and risk management, sustainable management, opportunities for community consultation, indigenous 'kaitiakitanga', and the importance of the principles of the Treaty of Waitangi.

Key words:

Environment,
Sustainability,
Geographical education,
Environmental education,
Education across the curriculum

GEOGRAPHY'S CURRENT AND FUTURE ROLE IN ENVIRONMENTAL EDUCATION: A NEW ZEALAND PERSPECTIVE

M. June Logie

1 INTRODUCTION

Environmental education (education 'about', 'in', and 'for' the environment), traditionally a major part of geographical education, has in recent times been seen as a separate curriculum area. The "National Strategy for Environmental Education" (1998) released by the Ministry for the Environment (MfE), however, shows that the New Zealand government seeks the "effective integration of environmental education within the school curriculum" (1998, p.15). This is seen as one of the seven outcomes necessary for the effective education of the whole populace. Consequently the New Zealand school curriculum targets a number of core learning areas, particularly the core areas of the junior curricula. These include Science (Planet Earth and Beyond; Making Sense of the Living World), Social Studies (Place and Environment, Culture and Heritage, Resources and Economic Activities); and Technology (Technology and Society, Technological Capability, Implementation and Production of Technological Solutions); as well as in the Health and Physical Education and Arts. The strategy, however, does not spell out a role for Geography in environmental education.

While Social Studies has been provided with an updated curriculum (New Zealand Ministry of Education, 1998), it is of some considerable concern to New Zealand Geography teachers (Holland, 1998; Newton, 1998; Stirling, 1998; Weir, 1998) that there is no revision planned for the co-ordinated Form 5 to 7 Geography Syllabus (MfE, 1990). The purpose of this paper is to describe the current role of Geography in environmental education, point out any shortcomings, and make recommendations for revision. For this purpose the results of content analysis (for evidence of environmental education) using the focusing questions of the Prescribed Common Topics of the Form 5 to 7 Geography Syllabus are described. A critical appraisal can be then be made of the opportunities and potential for environmental education offered by the Form 5 to 7 Geography Syllabus in the Social Sciences learning area on the New Zealand Curriculum Framework (Ministry of Education, 1993), the overall policy statement on the New Zealand curriculum.

2 ENVIRONMENTAL EDUCATION AND GEOGRAPHICAL EDUCATION COMPARED

2.1 The New Zealand background

Any attempt to describe the state of environmental education in New Zealand must start with the legislation that has been in place for the last seven years. Together with the Crown Minerals Act passed in 1991 (now one of ten key laws relating to the environment), the Resource Management Act (RMA) forms the basis for New Zealand's resource management legislation. Effects-based rather than activities-based, the RMA takes a participatory approach to the sustainable management of natural and physical resources that recognises the important role of Maori and takes into account the precautionary principle. It uses an 'eco-system' approach that recognises that elements of the environment do not stand alone and that effects of human activities on the environment are not discrete (MfE, 1997). 'Sustainability' is now the umbrella principle for the management of natural and physical resources, indigenous forests and fisheries (MfE, 1997).

Unfortunately, the general lack of understanding of the principles and processes of the RMA coupled with a lack of central government guidelines have made for considerable difficulties in administering the Act. The latter is a matter for the currently under-funded Department of Conservation and Ministry for the Environment; the former is addressed by the "Strategy for Environmental Education" (1998).

2.2 Definitions, goals, and objectives of Environmental Education and Geographical Education

"Learning to Care for our Environment" (MfE, 1998) uses the widely accepted 1970 IUCN definition which points to the influence of environmental education on values, attitudes and behaviour, the multi-disciplinary approach, and the emphasis on linkages between the biophysical environment, social, economic, and political activities:

> "*A multi-disciplinary approach to learning that develops the knowledge, awareness, attitudes, values and skills that will enable individuals and the community to contribute towards maintaining and improving the quality of the environment.*" (MfE, 1998, p 9)

Geographical education emphasises an 'integrative' approach (implying the integration of a variety of multi-disciplinary approaches) in order to make sense of a complex world. While environmental education emphasises education 'for' the environment (education that seeks to contribute to the protection and management of the environment), geographical education places more emphasis on 'education 'about' and 'in' the environment (Chidlow, 1997). It is useful to compare the New Zealand definition of geographical education with that of Whitlow (1984 as well as that of The Royal Geographical Society (in association with the Institute of British Geographers and the Geographical Association, 1998). The New Zealand Form 5 to 7 Geography Syllabus states:

> "*Geographical education aims to help develop an understanding of the total environment as the home of people; and, through its integrative approach, aims to foster a balanced view of and respect for the environment at all scales, from local to global*" (Ministry of Education, 1990)

In order to achieve these aims the 1990 Syllabus emphasises the importance of making soundly based decisions about the relationships between people and the environment, and associated issues; and how these decision-making abilities are to be developed. A set of important geographic ideas (*Location, Distance, Accessibility; Patterns, Processes, Regions; Interaction, Change, Systems; and Culture and Perception*) is used to explain simpler relationships observed in the environment. Combinations of ideas help the understanding of more complex relationships. The Syllabus also provides sets of learning activities, skills, resources, settings, knowledge, and assessment and evaluation.

Although the aims of geographical education promote understanding of a complex world they do not place the same importance on promoting concern 'for' the environment as the internationally recognised goals of environmental education (UNESCO-UNEP, 1978). Those goals are to do with fostering awareness of and concern about the economic, social, political and ecological interdependence , provide opportunities to acquire knowledge, values, attitudes, commitment and skills to protect and improve the environment, as well as creating new patterns of behaviour.

2.3 Terminology

While environmental education views the world from a rather ecocentric standpoint, geographical education promotes a more anthropocentric (people-based) view of the world. While this difference in focus causes some misunderstanding, a greater source of misunderstanding and frustration rests with the different meanings given to words in common usage, e.g. 'physical', 'cultural', 'relief', 'spatial', 'littoral', 'sustainable growth' 'environment', and 'development'.

3 CONTENT ANALYSIS: FOCUSING QUESTIONS OF PRESCRIBED COMMON TOPICS

The study of the Form 5 to 7 Syllabus Prescribed Common Topics (PCTs) was carried out in the latter part of 1998 because of strong anecdotal evidence that teachers put greatest emphasis on this part of the syllabus. Content analysis was based on a survey of leading New Zealand geographical educationalists' perceptions of key words and phrases connected with environmental education, together with their perceptions of the key principles and processes connected with the RMA , 1991 (Table 1).

TABLE 1: SURVEY RESULTS RANKED IN ORDER OF FREQUENCY

Environmental Education: Key word/phrase	RMA: key principles	RMA: processes	Relevant Important Geographic Ideas	Comment
Sustainability Environment Systems Interconnections Conservation Human population Values Processes About, in, for Positive action Consultation Resources	Sustainable management/ use of resources (monitor, reduce, mitigate effects of development) Treaty of Waitangi Conservation Consultation Responsible planning Protecting community values Aesthetic cohesion	Resource consent Appeals Assessment of environmental effects Plan formulation Policy formulation	Systems Processes patterns, regions Interactions Change Culture and perception Accessibility	All of the six IGIs are mentioned

Using these key words and phrases, content analysis was then carried out on the Focusing Questions and their associated IGIs. In this way the manifest content of environmental education can be compared with the not-so-obvious latent content (Figure 1). (Key words: Sustainability, Environment, Systems, Interaction, Conservation, Values, Human population, Processes)

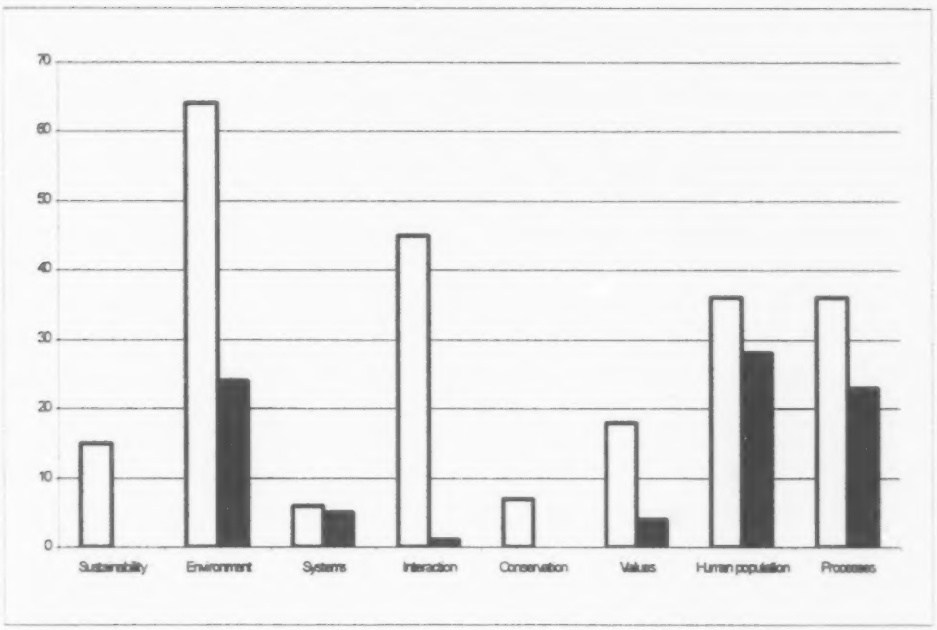

Figure 1: Comparison of Latent and Manifest Content Analysis of Prescribed Common Topics (Focusing Questions and Important Geographic Ideas)

4 DISCUSSION

The results of the survey (Table 1) reflect the wide knowledge and understanding of key environmental education ideas amongst participants. Content analysis of the Prescribed Common Topics (Focusing Questions and their associated IGIs) illustrates the small amount of manifest content of key words and phrases related to environmental education compared with the wealth of latent content.

5 CONCLUSIONS

The survey reveals a generally broad understanding of important key environmental education ideas. Carefully prepared resource material will enhance this understanding. Content analysis (both manifest and latent) shows that the main evidence of education 'for' the environment is found at Form 5 level ('Resources and their Use') and at the Form 7 level (The Role of Geography in Planning and Decision-Making'). There is plenty of potential, therefore, for incorporating further environmental education principles into the examinable Prescribed Common Topics.

The rather inflexible framework provided by the Focusing Questions leads to the conclusion that another, more flexible framework should be developed to incorporate a wider range of

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approaches. More importantly, many of the Focusing Questions fail to express the Important Geographic Ideas that are associated with them. Although teachers are directed to take these and the preambles into account, this cannot be left to chance. A case is therefore made for the urgent revision of these Focusing Questions. Environmental Education guidelines (at present being prepared) together with reference to other Social Science areas of the curriculum (e.g. Social Studies) and areas of the Science curriculum (e.g. Making Sense of Planet Earth) should provide a good basis for this revision.

In New Zealand, as elsewhere in the world, the key to the successful incorporation of environmental education 'for' the environment rests on the support given by geography teacher associations, together with the leadership provided by the New Zealand Association for Environmental Education. The Board of Geography Teachers of the New Zealand Geographical Society has responsibility for drawing important geographical education issues to the attention of the Ministry of Education.

6 REFERENCES

Chidlow, H.N. (1997) *Environmental Education in Auckland Schools.* Research paper submitted for M.Ed. Deakin University: Faculty of Education.

Holland, P. (1998) A Revolutionary's Syllabus? *New Zealand Journal of Geography*, 106: 1-6.

Ministry for the Environment. (1997) *The State of New Zealand's Environment 1997.* Wellington: Ministry for the Environment and GP Publishing.

Ministry for the Environment. (1998) *Learning to Care for Our Environment – Me Ako ki te Tiaki Taiao: A national strategy for environmental education.* Wellington: Ministry for the Environment.

Ministry of Education. (1990) *Syllabus for Schools. Geography Forms 5-7.* Wellington: Learning Media, Ministry of Education.

Newton, M. (1998) Do We Need a Syllabus Change? *New Zealand Journal of Geography*, 106: 7-8.

Resource Management Act. (1991) Reprinted as on 1 March 1994. Wellington: New Zealand Government.

Stirling, S. (1998) A Geography Syllabus for the Next Millennium. *New Zealand Journal of Geography*, 106: 12-16.

UNESCO-UNEP. (1976) The Belgrade Charter: A Global Framework for Environmental Education. *Connect* I (1): 1-2

UNESCO-UNEP. (1978) The Tibilisi Declaration. Connect III (1): 1-8

Weir, A, (1998) The Integrated Form 5 to 7 SyllaBUS. Do We Need to Change or Just Re-tune? A Geography Mechanic's Perspective. *New Zealand Journal of Geography*, 106: 17-18

Whitlow, J.B. (1984) Penguin Dictionary of Physical Geography. London: Allen Lane Penguin Books Ltd.

ENVIRONMENTAL EDUCATION - PERSPECTIVES FROM COLOMBIA

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Since 1994, as part of Colombia's Educational Reform, Environmental Education (EE) was compulsory in both formal and non-formal sectors. Those drafting the legislation appear to conceive of environmental problems as social problems reflecting a particular kind of social organisation and its relation with the natural environment. As a result, the official definition of EE appears to be that it is a process that allows individuals to understand the interdependence of their environments, based on a reflective and critical knowledge of their biophysical, social, political, economic and cultural situation. The official perspective gives EE a very broad and powerful frame of action, especially because of the complexity of the Colombian context and the different array of conflicts that arise, a colonial social structure, a history of violence and warfare, a highly polarised society, government policies that reinforce the process of globalisation and a pluricultural population with different mythologies and lifestyles. This paper will critically analyse some of the contextual complexities and will show how different EE initiatives in Colombia aim at addressing environmental problems, some in a 'preventative' way and others through more of a 'healing process'. Then, based on a socially critical approach in which EE provides an opportunity to produce fundamental changes in social, economic and political structures by challenging current paradigms and worldviews (Huckle, 1997; Gough, 1997; Webster 1997) the paper will review the initiatives to show their potential to produce social changes.

ENVIRONMENTAL EDUCATION: PERSPECTIVES FROM COLOMBIA

Ana Maria Duque-Aristizábal

INTRODUCTION

This paper examines the context of Environmental Education (EE) in Colombia. It is argued that the environment is a social construct and that, consequently, environmental problems are social problems and that reflection about EE needs to be socially based. The Colombian context, built on a strong social, economic, cultural and political colonial heritage (inscribed in a North-South divide) has contributed to the construction of current realities based on imported patterns and worldviews. The concepts of development and sustainable development are discussed, showing how ideas were brought to the country and have been re-conceptualised from Colombian or Latin American perspectives. Finally, some of the challenges facing EE to provide a space for reflection for the de-construction and construction of new realities in such a rich context are considered.

ENVIRONMENTAL EDUCATION: THEORETICAL CONSIDERATIONS

The environment is a social construct, because, as Noel Gough says, its objects, elements and meanings 'cannot be presumed to exist independently of human perception and activity' (in Gough 1997: 83). Consequently, it is necessary to approach and understand environmental problems as social problems (Gough 1997). Therefore, the debate around EE must have this social dimension too. Di Chiro grounds her analysis of a feminist theory for EE as follows: 'Environmental Education (should offer) a more complete analysis of the environmental problems and therefore a better understanding of those problems and their potential solutions. Such an analysis is political, in that it examines how power relations (for example, gender, class, race) shape the world in which we live' (in Gough 1997: 121). A socially critical approach to EE also provides an opportunity to produce fundamental changes in social, economic and political structures, by challenging current paradigms and worldviews' (Gough 1997: 69). Both these definitions could address contextual issues in Colombia and hopefully, produce some reflections for change.

THE COLOMBIAN CONTEXT: A TRADITION OF COLONIALISM

To attempt to explain the complexity of the Colombian context is a very difficult task. The population is an extensive mix of Europeans (mainly Spanish), indigenous peoples and black Africans brought in as slaves. This mixture is reflected in cultural and religious expression too. Although over 90% of the population are of mixed racial origin, a small percentage remains almost unmixed: 5% white, 1% Afro-Colombian, 2% indigenous peoples (including 60 linguistic families, some having their own traditional culture and social organisations). The country inherited a strong colonial tradition which encouraged historical privileges for many, especially for European descendants, and excluded, until the 1960s, the rest of the population from any sort of active participation in the political and economic activities of the country. Colombia's guerrilla groups and the illegal drug trade started as a consequence of such exclusions. Colombia considers itself as a capitalist country, but until the middle of this century it still had clear remnants of a feudal system: rich land owners and peasant workers who developed a lifetime dependence on them (Kalmanovitz 1989: 14). The Catholic

Church, through its belief system and ideal of purity, also helped in this process of social, economic and politic marginalisation and exclusion. Up until the middle of the 19th century, education was dominated by the Church. Education was characterised by the French Napoleonic tradition in which discipline, authority, memorisation and a passive student were the rule. The result was an education for exclusion or disjunction rather than one for conjunction and inclusion. These historical aspects have determined the ways our identities, value systems and knowledge were originally shaped and have left a backlash of intolerance, lack of respect for the 'different' and lack of opportunities and inclusion for the many.
After the second world war, the Northern concept of development rose to prominence - a new form of colonialism. US President Truman said in 1949, 'For the first time in history humanity possesses the knowledge and the skills to relieve the suffering of these [poor] people ... Greater production is the key to prosperity and peace. And the key to greater production is a wider and more vigorous application of modern scientific and technological knowledge' (Escobar, 1995a: 3). Colombia underwent a process of restructuring aimed at achieving fast growth. These rapid changes on the path to modernisation brought unrest and more violence (Kalmanovitz 1989: 7) as local cultures were not taken into account. The financial costs of the technology, the 'know how', and the capital required to implement these changes were also huge.
According to Escobar (1995b: 87-8), the discourse of development created categories such as 'poor', 'illiterate', 'peasant' and 'underdeveloped' which were problematised as 'abnormalities'. For the solutions to succeed there had to be some 'reform', which led to new categories: the 'Reformers' and the 'Reformed'. The 'Reformers' had the knowledge and the political authority to make reform happen. They 'knew' what was best for the 'Reformed'. The authority with which the 'Reformers' invest themselves, through their 'knowledge', 'entitled' them to moral, professional and legal authority. Technological and scientific changes were brought in as were new worldviews, living standards, needs and ways to satisfy them, along with new models of the economy that resembled those of the 'Reformers'.
The stages of imposition of Western values are two expressions of Colonialism. According to Loomba (1998: 4), colonialism refers to the physical occupation of a territory involving the extraction of tribute, goods and wealth resulting in deep socio-economic, political and cultural changes. Usually the colonised become key elements in the conqueror's economic life. Thus, the establishment of European rule is considered as Colonialism and the interventions on development can be seen as a sophisticated expression of Colonialism, what Loomba calls 'Imperialism', the higher stage of colonialism. It does not necessarily refer to the occupation of land, so it could happen without the establishment of 'formal colonies' but the system of economic, cultural and social domination and control is embedded in the relation between the countries (Ibid.: 6). It is difficult to define these terms in changing times, especially now when nation states tend to become subdued under the growing power of global economics. It is still relevant to recall what Hume says: 'the Caribbean and Latin-America still struggle with the effects of colonial domination and neo-colonialism' (in Loomba 1998: 19).
Colonialism brought 'representations [that became] dominant and shape[d] ... the ways in which reality is imagined and acted upon' (Escobar 1995a: 5). From a power position the 'other' brings the tools to define yourself and your own reality. But these tools are biased by the 'other's' reality. Said (in Loomba 1998: 47) showed how the West defined Orientalism and its political implications as follows: 'Orientalism, or the study of the Orient, was ultimately a political vision of reality whose structure promoted a binary opposition between the 'familiar' (Europe, the West, 'us') and the 'strange' (the Orient, the East, 'them')'. The new construction becomes a reference point to produce the knowledge required to define the 'Orient', in this case. So the 'self' ends up being defined by the 'other'.

In the 1980s, the notion of sustainable development rose to the fore. Defined as development that meets the needs of present generations, without compromising the possibilities of future generations of fulfilling their needs (WCED 1987: 8) the idea was legitimated by the Rio Earth Summit (Grubb et al., 1993: 8). The term reconciles the interests of increasing economic growth with concern for the environment; however, these are opposing forces and are irreconcilable. The concept of sustainable development has been highly contested by scholars and environmental activists in the North and the South. Different interpretations and constructions of the term have arisen based on different philosophical and political positions. The initial definition of sustainable development created a strong reaction among Latin American scholars, whose critiques involve other aspects: 'The Latin American perspective ... starts by pointing out the need to differentiate environmental problems according to the region where they occur, not falling into dangerous global homogenisation of them, the inadequate model of development, the global inequalities and the historical environmental debt of the Northern countries, equity, the importance of respecting cultural pluralism, and the protection of the natural and genetic patrimony of the region. And more than their Northern colleagues (the Latin American scholars) advocate for a conceptual construction of 'ecology' in political terms' (Escobar, 1994: 100).

In 1991, a new Constitution introduced many important changes: space for public participation and instruments to allow citizens a right to participate in government affairs; decentralisation of the government; recognition of the rights of ethnic minorities to the land where they had always lived. Colombia faces a major land titling process that has unveiled individual interests and caused many problems. The Constitution also introduced Education reform that includes ethnic education, curriculum development based on local and community needs and mandatory implementation of EE in formal and non-formal systems with a high political dimension. The Ministry of Education defines EE as: 'a process that allows individuals to understand the interdependence of their environments based on a reflective and critical knowledge of their biophysical, social, political, economic and cultural situation' (Torres, 1994: 17). Financial reforms in the 1990s were based, *inter alia*, on World Bank packages of trade liberalisation, privatisation, labour market reform. These imply that we now represent new markets for foreign products and we are encouraged to go out to compete with our products, in a quite inequitable game. The guerrillas are now stronger and much more active, with an increased aim of political power, which they are achieving gradually. Paramilitary or self defence groups have appeared, with support from the Government and the army, in order to protect the interests of the big landowners threatened by the guerrillas' activities. Therefore, there are diverse sources of conflict that come from the encounter of all these different backgrounds, interests, worldviews and cultures.

THE ROLE OF ENVIRONMENTAL EDUCATION

Any Colombian EE initiative needs to start by trying to make sense of the complicated context. The complexity determines the range of initiatives, e.g. conflict resolution, teacher development, education in areas of armed conflict, territorial organisation and management, legal empowerment, cultural and environmental values to restore people's self-esteem, sustainable productive practices, food security systems, and ecotourism, among others.

It is necessary to contextualise EE from a social standpoint, one that questions power structures and the ways that these structures have shaped our lives and the ways to propose changes. There is a need to deconstruct the old discourses that have created the old identities, to invite a reconstruction of the collective and the individual selves. A reconstruction that empowers and liberates. In this sense I agree with both the feminist and the socially critical

approaches to EE. EE could help us see ourselves as who we really are, with all the variety produced by this extensive ethnic and cultural mixture. It could help us construct our identities from a strong sense of confidence and self esteem, because as Loomba (1998: 185-186) says 'anti-colonialism had to create new and powerful identities for colonised peoples and to challenge colonialism not only at a political or intellectual level but also on an emotional plane'. EE should be grounded on values of respect for others and other forms of life, of equity and pacific conviviality which allow the individual and the group to participate in the development of their productive systems grounded on cultural values. The remainder of the paper focuses on two recent examples of EE in Colombia.

Pacific Coast Community Project

The Pacific Coast Community lives in the Choco biogeographic region (tropical rain forest). The temperature and humidity are high and the land is not fertile. It was originally inhabited by indigenous groups and, after the abolition of slavery, by black people, who developed their own survival practices, hunting, fishing and collecting fruits. They had 50 years to construct their own new 'free' identity before Modernity reached them, through the construction of a main road that aimed to develop the Pacific. The connection to the rest of the country produced economic, cultural and political dependence - the imposition of new lifestyles and the idea of the city as the modern promise of happiness and fulfilment. In 1996, the project leader, Marta, a woman whose ancestors come from the region, started reviewing with the community the main problems and their causes. The process questioned aspects of their lifestyles - the lack of autonomy, low self esteem, low sense of belonging - which seemed to be the main causes of massive migration of young people to the cities. One initiative was to help the young to see the hard life they could have in the city, being black and peasants. During a one week visit they were aware of the lack of possibilities they shared with other marginalised people form their region. They realised how lucky they were to live by the Pacific. This brought many challenges to these young people and with the rest of the community they began finding ways to become more independent (in terms of food, medicine and culture) and they are starting to build educational projects that address their needs. Marta talks about an 'education for liberation' in the sense of freeing oneself from the structures established by others (Gomez, 1998). One of the achievements of her work, which also has many difficulties and contradictions, is that the young now have a stronger sense of self-esteem and belonging and some of them are starting to make conscious choices for their lives, even if these do not represent lead to economic benefits.

Nasa Project

Although not conceived as an EE initiative, what the Nasa Project has achieved in 17 years is an outstanding example of EE. The Nasa people have also been on the receiving end of marginalisation and racism for a long time. They lost most of their land and many of them their cultural identities in a process of hybridisation and dominance. They became almost completely immersed in the dominant culture which dictates that it is shameful to be indian and speak their own language.

17 years ago a dream of reconstruction and political empowerment took place among them. They had the support of an influential Nasa priest and two Italian missionaries. The process has been very difficult, they have fought to get their land back and this struggle has cost many human lives, but they consider that common interests are more important than personal. They are prepared to face any kind of conflict, especially now because they have built a strong community based on their culture and value system. There are approximately 150,000 Nasa people, of which 70,000 take part in the Nasa project which was constituted from ten

projects in small towns and 30 communal economic projects. The people involved in the project have recovered 140,000 Ha. of communal land. They are now politically empowered and represent a strong force in the country. 4 indigenous mayors have been elected and there is a Nasa representative in Congress. They have political recognition from central government, NGOs, Universities, the international community and from the guerrilla groups that operate in that department (with whom they have a signed agreement of no aggression and interference). The Nasa have used the legislation on ethnic education to design an education system that suits their needs and are hoping to develop an economic system that allows them to maintain their values of community as well as having the necessary links with the national economy. They are being very pro-active in analysing the national context with the support of some universities to design their future steps and negotiate with the government the new legislative implementations that they require. The Nasa Project might well represent the largest 'quiet revolution' in Latin America (Nasa Project, 1998).

REFERENCES

Escobar, A. (1994) El Desarrollo Sostenible: Dialogo de Discursos. *Revista Foro, 23: 98-112.*

Escobar, A. (1995a) *Encountering Development, the Making and Unmaking of the Third World.* Princeton: Princeton University Press.

Escobar, A. (1995b) The Making and Unmaking of the Third World through Development. In M. R. a. V. Bawtree (Ed.) *The Post-Development Reader*. London: Zed Books.

Gomez, M. (1998) Research Interview Transcript # 01. October.

Gough, A. (1997) *Education and the Environment: Policies, Trends and the Problems of Marginalisation.* Victoria: Deakin University Press.

Grubb, M. et al. (1993) *The Earth Summit Agreements: A Guide and Assessment*. London: Earthscan Publications.

Kalmanovitz, S. (1989) *La Encrucijada de la Sinrazon.* Bogota: Tercer Mundo Editores.

Loomba, A. (1998) *Colonialism/Postcolonialism.* London: Routledge.

Nasa Project (1998) *Toribio: Tiempo de Cosecha.* Video Documentary.

Torres, M. (1995) *Lineamientos Generales para una Politica Nacional de Educacion Ambiental.* Bogota: Ministerio de Educacion Nacional.

World Commission on the Environment and Development (WCED) (1987) *Our Common Future*. Oxford: Oxford University Press.

EXPO '98 - INFLUENCE ON ENVIRONMENTAL EDUCATION IN PORTUGUESE SCHOOLS

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The main theme of Expo '98 was the Oceans. Pupils were taught by their teachers in schools about the Oceans resources, problems and preservation, in order to prepare them to visit Expo '98. An investigation was done in secondary schools from the Lisbon region as a means to determine the influence of both this preparation and the visit to Expo '98 on the knowledge, values and interests of pupils about the Oceans. A questionnaire was sent to pupils from different schools. Teachers were also interviewed in order to understand the influence on their teaching practice of the visit to Expo' 98. Results point to different realities according to pupils' age, gender, social background and the kind of work done in classrooms.

SOCIAL JUSTICE AND ENVIRONMENTAL CONCERNS: THE CASE OF SOUTH AFRICA

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Lloyd Timberlake (1985) once described apartheid as a political system that has institutionalised environmental bankruptcy in South Africa. Admittedly, Timberlake sought to link the injustices of apartheid with environmental problems that characterised the apartheid era. Despite evidence of the environment as a mixture of physical, social, political and economic realms, the national curriculum of the apartheid era remained self-censored on these realms. The search for social justice in post-apartheid South Africa not only re-opened the broader conceptualization of the environment, but also provides a framework in which environmental concerns embrace concern for human rights and redress. Section 24 of the Constitution, for instance, acknowledges the connection between the environment, health and well being. This framework has implications for the content of environmental education. Thus, environmental educators are required by the constitution to promote knowledge of, and the right of individuals to an environment that is not harmful to their health and/ or well being. As environmental rights enshrined in the constitution also places obligations on the state, the state becomes an integral part of the object of study.

The purpose of this paper is to illustrate how apartheid and post-apartheid government policies have shaped the content of environmental education. The paper argues, by way of a detailed case study, that environmental concerns cannot be appropriately addressed without consideration for social justice. Logically, environmental education should confront issues of social (in)justice.

SOCIAL JUSTICE AND ENVIRONMENTAL CONCERNS: THE CASE OF SOUTH AFRICA

Maano Ramutsindela

1. INTRODUCTION

> If there is a hole in the ozone layer and this is dangerous to all people, then we need to do something about it. And if something needs to be done, then we need to decide what is causing it and to do something about it (Garner, 1996, p.5).

This citation reminds us not only about the traditional concerns of environmental education with the physical elements of the environment, but also reflects how answers to environmental questions have been conditioned by our perception of the 'environment'. Admittedly, the raw material of environmental education has been the deleterious effects of human actions on the planet, actions that were and still are thought to stem from lack of knowledge. In this context, the UN Geneva Conference on Environment and Development in 1991 concluded that, 'the more knowledge available in the hands of educated people capable of understanding the information the greater the chances are of significantly reducing environmental damage and preventing future problems'. Such emphasis on knowledge of the 'educated people' profoundly undermines the ability of 'uneducated' local communities to manage their own environments. In reality, environmental problems are more complex and cannot be reduced to a mere 'lack of knowledge'. In fact, our advanced knowledge in technology is also accountable for some (by no means all) of our environmental problems. This then raises the question: what should inform the content of a 'relevant' environmental education? The discussion below attempts to answer this question by drawing examples from South Africa. This paper argues that the injustices of apartheid should form a crucial aspect of environmental education in South African schools. The paper employs the concept of 'social justice' in the context of the 'burden of the past', in order to situate the content of environmental education in the post-apartheid era.

2. ENVIRONMENTAL BANKRUPTCY AND THE UNJUST SYSTEM

A gamut of literature on environmental concerns in South Africa suggests the link between the injustices of apartheid and environmental bankruptcy (see Ramphele, 1991; Vogel, 1992; Ramutsindela, 1997). It is common knowledge that the apartheid system pushed the poor to impoverished environments, and went to an extent of settling communities on sinkholes where scores of sleeping residents could vanish into a giant hole. As the *Weekly Mail* (15-22 June 1989, p.8) put it, 'the ecology of apartheid crowded the most wretched people onto the most wretched land'. Unsurprisingly, the national geography curriculum introduced environmental education in the form of ecology, but remained self-censored on 'real' environmental problems. The objectives of environmental education were clear: pupils need to develop an environmental awareness and need to feel a commitment towards the environment by developing a 'caring attitude' (South Africa, 1987). The main focus was the physical realm of the 'grandeur and wonder of creation'. This was of course

not unique to South Africa, but the peculiarities of environmental education in that country was the clear link between the political system and environmental problems. Students were to learn about soil erosion as caused by the unwise use of the land, yet the government was also responsible for keeping the 'bad farmer' on land. One can be forgiven for concluding that environmental education under apartheid was about the soil, animals and plants. No wonder why the World Environment Day in 1991 was celebrated in South Africa under the theme 'soil is life' (*Star*, 5 June 1991, p.10). Undoubtedly, soil is and will remain 'life' – what about the millions of people who were removed from their 'soil'?

Practically, attempts to introduce 'ecology' as part of geographical education in South Africa were a response to the global environmental concerns of the 1980s. These concerns could not be properly adapted to the local syllabus that emphasized the division between physical and human geography. There were, however, views that environmentalism in geography could provide the much-needed link between human and physical geography. The opportunity to foster such a link was lost as geography teachers were ill-prepared to teach an environmentally sensitive geography. In fact, some geography teachers expressed misgivings about the inclusion of 'ecology' in the syllabus. The importance of the link notwithstanding, what was missing in environmental education in South Africa was the acknowledgement of the different environments that replicated the division of communities in that country. Basically, the question was whose environment should form the core of environmental education, a question that was rendered complex by a fragmented education system. More crucially were the attitudes and values that environmental education aimed to promote. These values remained ambiguous to those communities whose values and attitudes were marginalized in the education system. While attempting to introduce environmental education into the core geography, the government and geography educators failed to appreciate the existence of many different attitudes and values towards the environment. Thus, the narrow content of environmental education in South Africa is a product of the education system during the apartheid era.

3. A NEW GOVERNMENT: A NEW ENVIRONMENTAL EDUCATION

South Africa's problems in many spheres of life called for radically changes which began to take shape after the first democratic national election of 1994. The education system was reorganized and refocused to meet the needs of a new society and a new political dispensation. There is a major shift from a content-based to an outcome-based curriculum. This shift has profound implications on the nature and content of school subjects. The new curriculum has absorbed all subjects into eight learning areas: language, literacy and communication; mathematical literacy, mathematics and mathematical sciences; human and social sciences; natural sciences; technology; arts and culture; economic and management sciences; and life orientation. These learning areas imply that there is no longer a subject called 'geography' at school level. The content of geography is rather spread between the natural sciences and the human and social sciences. The natural sciences, for instance, embrace the (physical) environmental aspect of geography while the 'environment' is also included in the human and social sciences where human geography traditionally belongs. By design, this arrangement pre-empts the nature of environmental education. The disappearance of the name geography in Curriculum 2005 is a matter of serious concern among South African geographers as their subject has been 'thrown out of school'.

Arguably, the most important challenge to (geography) educators in South Africa is how to reorganize the learning material that appear 'floating' between subjects. The emergence of learning areas in post-apartheid South Africa offers opportunities for the development of environmental education. The Ministry of Education shows (at least for now) interest in environmental education instead of 'geography' as revealed in the Minister's letter to geography educators:

> The importance of Geography can also be seen in Environmental Education which will be addressed in most of these learning areas as a *cross-curriculum* issue ... the Department of Education ... has committed itself to ensuring that Environmental Education will be an element at all levels and in all programmes of the education and training system, in order to create environmentally literate active citizens (Bengu, 24 March 1998).

Though the words of the Minister can be criticized as a political statement, they nevertheless show a window of opportunity for the development of environmental education. The challenge is how to realign 'geography' to the envisaged environmental education or even to direct the vision of environmental education.

4. SCOPE FOR CHANGE

4.1. Environmental rights

As shown above, environmental problems in the apartheid era were inextricably linked to the injustices of the system of the state. This historical fact notwithstanding, what remains critical in the new South Africa is the nature of the content of environmental education. Questions can be raised: what is the impact of the new political dispensation on the content of environmental education? How does environmental education simultaneously respond to new national and global demands for equity? As already alluded to, the new government has initiated changes in all school subjects, geography included. These changes are a manifestation of the broader national agenda that aims to transform South Africa into a non-racial and 'just' society. This agenda not only seek redress, but also aims to promote human rights. More importantly, these rights are extended to cover those related to the environment as contained in Section 24 of the constitution:

> Everyone has the right to an environment that is not harmful to their health or well-being; and to have the environment protected for the benefit of present and future generations through reasonable legislative conservation; and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development

There is no space here to debate the practicalities and implementation of constitutions. The purpose for citing the constitution is rather to highlight the mantle that need to be seized in order to include social justice in environmental education. Arguably, the way the apartheid system contributed to the destruction of the environment warrants attention in the curriculum to enable students to grasp current and future environmental problems. Such environmental history could be helpful in keeping students focused on the wider implications of present and future government policies

which affect the environment. In this context, the state also becomes a subject of study in environmental education. As Mamphele Ramphele (1991, p.11-12) has warned,

> It would be naïve to assume that a democratic system of government is a sufficient condition for environmentally sound policies. The conflicting demands of economic development and growth on the one hand, and the maintenance of ecological balance on the other, are likely to place any future government in a difficult position.

Of equal significance is the balance between the search for social justice on the one hand, and environmental protection and management on the other. A number of land claims that are sanctioned by the government's land reform programme are directed towards some of the country's prime ecological zones, for instance. Furthermore, the land reform programme as a whole is bound to have serious environmental implications on land and the hitherto disadvantaged communities. In some cases, the new government has been successful in promoting social justice while, at the same time, being mindful of the need to protect the environment, as illustrated by the vignette below.

4.2. Land rights and justice: a vignette

The creation of the well-known Kruger National Park resulted in the displacement of communities such as the Makuleke who lived in that area. The Makuleke were removed from the north-eastern corner of South Africa in 1969 in order to extend the area of the Kruger National Park towards the Limpopo (River). The official reason behind the removal was the creation and natural extension of the public good – although the Makuleke were not considered part of the 'public' at that time. The community was resettled in the hostile environment in the former Gazankulu bantustan. In search for social justice, the new government promulgated the Land Rights Restitution Act 22, signed into law by Mandela on 17 November 1994. The tenet of the Act is to redress the suffering caused by the policy of forced removals (Ramutsindela, 1999). This Act empowers communities to claim land rights lost due to racial policies. In this context, the Makuleke qualified to reclaim part of the Kruger National Park from which they were forcefully removed. Since the claim was directed at what is regarded 'the Crown Jewel of the Kruger National Park', environmentalist groups were unsympathetic to the community and opposed the claim outright. For its part, the National Parks Board continued to defend the long-established tendency of park authorities to imagine and 'feature a landscape empty of indigenous peoples' (Simon and Dodds, 1998, p.604). Thus, the government's attempt to redress the injustices of the past was construed by environmentalists as undermining environmental protection. The apparent conflict of interests between social and environmental justice were harmonized by restoration of land rights to the Makuleke community with the *proviso* that that community would use its land for conservation and tourism purposes.

What this vignette reveals is the possibility to address social justice in ways that could still enhance environmental goals. Such possibilities should be encapsulated into the content of environmental education, more especially because the government has opened the national agenda for dealing with the legacy of the past. This is not to confuse environmental education with environmental history, but rather to argue that

the legacy of the past provides an important launch-pad for a 'balanced' environmental education. By capturing the past, concepts of social justice and equity will not only enrich the content of post-apartheid 'geography' (or better known as environmental education), but could contribute to sensitizing students to the need to respect the 'environments of others'. In the vignette above, the local knowledge of the community to manage the environment was seriously undermined by a racist state that regarded that community as inherently inimical to conservation. As the growing body of environmental literature has shown, local knowledge of a community can be harnessed for sustainable environmental management.

CONCLUSION

As Williams (1999) has shown, environmental inequality operates at multitudes of scales from local to the national and international scales. At the international scale, environmentalists acknowledge that the operation of the world economy account for some of the teething environmental problems of this and the future century. Irrespective of the scale of operation, the victims are the poor local communities. The plight of, and injustices on these communities provide a text through which environmental education can be enriched. Environmental problems caused by multi-national companies in countries of the South need no retelling here. Their activities provide an entry point into environmental justice and social equity. In the case of South Africa, there is a very limited scope, if any, in which environmental education (or geographical education) can 'move forward' without reflecting on environmental and/or social (in)equality and (in)justice. By incorporating these aspects into the national curriculum, the subject could be a position to meet its demands and obligation both nationally and internationally. However, caution should be taken to avoid going to the other extreme: assuming that environmental problems in South Africa are only historical and political. The technical core remains equally relevant.

REFERENCES

Bengu, S.M.E. (1998) *Letter of Appeal: Geography in Curriculum 2005*. Cape Town.

Garner, R. (1996) *Environmental Politics*. London: Prentice Hall

Ramphele, M. (1991) *Restoring the Land: environment and change in post-apartheid South Africa*. London: Panos.

Ramutsindela, M.F. (1997) The Environment and Internal Migration in South Africa. In M. Gray (Ed) *Evolving Environmental Ideals: changing ways of life, values and design practices*. Stockholm: Royal Institute of Technology.

Ramutsindela, M.F. (1999) Compromises and Consequences: an analysis of South Africa's land reform programme. *Arab World Geographer*, 1(2):155-169.

Simon, D. and Dodds, K. (1998) Introduction: rethinking geographies of the North-South development. *Third World Quarterly*, 19(4):595-606.

South Africa. (1987) *Geography Std 10 Syllabus*. Department of Education.

Star, (1991) Trends: helping you keep up with the future. 5 June.

Vogel, C. (1992) The South African environment: horizons for integrating physical and human geography. In C. Rogerson and J. McCarthy (Eds) *Geography in a Changing South Africa: progress and prospects*. Cape Town: Routledge.

Weekly Mail, (1989) The Cruel Earth. 15-22 June.

Williams, R.W. (1999) Environmental injustice in America and its politics of scale. *Political Geography*, 18(1):49-73.

FITTING ENVIRONMENTAL EDUCATION (EE) INTO THE GREEK EDUCATIONAL SYSTEM: THE ORGANISATION AND DEVELOPMENT OF AN IN-SERVICE TRAINING PROGRAMME FOR SECONDARY TEACHERS

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This paper explores the way particular features of the Greek Educational System and the implications that they impose upon teachers' practice, influence teachers' views about the practice of EE. The paper is based on a larger research project about the in-service training of secondary teachers on EE.

In the EE literature two major research traditions may be identified, influenced respectively by positivism and hermeneutics. Although EE research started with major contributions from positivism, in recent years a crucial shift to the latter is taking place, which positions hermeneutics and critical theory as the dominant features of EE research and theory. However, EE within the education system is mainly characterised by the domination of positivism which imposes certain teaching practices, as a consequence of its major ideological assumptions about knowledge. These practices are better evidenced in a centralised system, such as the Greek Educational System (GES). One of the basic features of positivism is the compartmentalisation of knowledge into subject disciplines, which are challenged by the cross-curricular nature of EE and its consequences upon teaching methods and the traditional power relations within the school classroom.

In this paper, the "culture" of the difficulties that EE faces in its process of permeating the GES is examined through the case-study of the development and organisation of an in-service training programme for secondary school teachers. The paper examines the organiser's views about the nature of the programme as well as some initial evaluation suggestions by the teacher participants.

FITTING ENVIRONMENTAL EDUCATION INTO THE GREEK EDUCATIONAL SYSTEM: THE ORGANISATION OF AN INSET PROGRAMME FOR SECONDARY TEACHERS

Apostolis Panagiotou

1. INTRODUCTION

I remember that when I was starting my PhD in 1995, a friend of mine, teacher of primary education, told me: "So now you will become like those people who come to my school and tell us what to do, although they have no idea of how school really works!". I recorded her comment and during my PhD research, I recalled it on two basic occasions. The first was while I was reading the Environmental Education (EE) literature. In my opinion my friend's comment reflected the gap that exists between theory and practice and possibly an "antagonistic" relationship between educational theorists and actual practitioners. Furthermore, her comment motivated me to search in the EE literature for theories that attempt to bridge this gap and emphasise the central role that practitioners have in educational processes.

2. BRIDGING THE THEORY PRACTICE GAP

In recent years there has been a shift towards the bridging of the theory-practice gap in EE. This shift reflects to a certain extent relevant developments in the field of education in general, mainly through reflective practice and action research (McNiff 1988). Fien wrote about the so called "rhetoric-reality gap" and he placed in the centre of the education *for* the environment approach. He argued:

> "the rhetoric-reality gap between the affective and social participation objectives of education for the environment and the consequent emphasis on environmental knowledge and awareness in most programs, represents the first part of the curriculum problem of EE" (Fien 1993, p.9).

According to Robottom (1990, p.68), this gap is largely owed to the priority that is given to environmental philosophies rather than educational philosophies in the EE curricula. Due to its development and to the first influential theorists in the field, who have been mainly scientists with some educational qualifications (Greenall-Gough 1993), EE has been traditionally connected with environmental sciences and especially with ecology which has constituted the ground discipline for the formulation of EE courses in all levels of formal education (Schaefer 1980, p.5, Trotman 1978, p.88). Therefore, the framework within which EE has evolved had scientific orientation and the research generated in the field had a positivist approach.

However, in more recent years the shift to the educational ideologies which undermine EE is of such a crucial importance that at least in the level of theory production we could argue that hermeneutics has become dominant. A major contribution to EE resulted from critical theory which

> "tries to understand why the social world is the way it is and, more importantly, through a process of critique, strives to know how it should be" (Huckle 1993, p.5).

Robottom and Hart (1993, p.11) define critical theory as the process where social thoughts and actions are placed within their historical context and the discourse conducted involves notions of power and control. Critical action research is an important element of praxis within the framework of critical theory which could enable teachers to participate in the formulation of a critical curriculum for the EE. A basic aspect of critical theory is teachers' and students' involvement in real life issues and the quest for solution to local environmental problems that could place schools as centres for the generation of important knowledge. An example of the use of action research in real life situation was the OECD-CERI The Environment and Schools Initiative project (OECD 1994, 1995). The quest for knowledge involved two kinds of reflection during the project. The first kind was students' reflection on their environmental values and attitudes and the second kind was teachers' reflection on their educational practices (Mayer 1995).

This constituted the basic conceptual framework that I used to proceed to the research of an in-service training programme. The aim was to identify processes and situations where teachers change their "common understanding" of EE.

3. THE DEVELOPMENT AND THE ORGANISATION OF THE INSET ACTIVITY

I took the above framework into consideration for a critical in-service programme and I combined it with some preliminary results of a questionnaire survey which allowed me to formulate a general idea about the status of EE in the region of Ioannina in North Western Greece. I then proceeded to the development of an in-service programme for secondary teachers, focusing on traffic problems in the city of Ioannina. The programme fulfilled the characteristics of Robottom's (1992) suggestion about in-service courses and attempted to lead teachers towards a critical reflection on EE and its place within the GES.

The problem started when the INSET office of the Local Education Authority (LEA) refused to include my in-service programme within the INSET courses for the year 1996-1997, due to specific instructions they had from the Ministry of Education for the in-service courses of that year to focus to the changes that had recently been introduced to the educational system. I contacted the EE co-ordinator of the region and I convinced her to proceed with an in-service programme outside the official scheme of in-service training, however under the authority of the local office for EE. This of course resulted to a change in the division of power. From that point onwards I was not the only responsible for the in-service programme but the EE co-ordinator had the major responsibility, as the name of the office for EE would be the organiser of the in-service programme. This initial silent agreement resulted to further compromises during the organisation of the programme. These are of particular interest because they reveal the context where EE has to be implemented and developed.

One of the first silent agreements was that there should not be an in-service programme for teachers, with only her and me being the main developers of the particular sessions. The EE co-ordinator wanted to "honour her colleagues" (research diary 23-1-97). That meant that "experts" from the local university should come and give lectures on their latest research projects, informing thus the teachers about recent advances in various scientific fields. A second compromise was that because she wanted to encourage the newly addressed Health Education (HE) co-ordinator with whom she happened to share the same office, she would include him in the organising procedures of the in-service programme. Her contacts with the people in the local university resulted to an involvement of staff from the Laboratory of Physiology of the Medical School, who would deliver lectures and would help with the practical part of the in-service programme, which would focus on the analysis of the water and the ooze of the lake of Ioannina as well as on the techniques of composting. The in-service programme took place in late February early March of 1997 under the title: "Environment-Health-Education: Inter-relatedness".

As it becomes obvious from the title, the programme had three main focuses: environment, health and education. The position that each topic held in the title is indicative of the importance given to the respective topics. An in-service programme which was addressed to secondary teachers placed education on the third level of importance compared to environment and health. The structure of the programme also showed the position that teachers had within it. Thus, the various sessions of the programme were articulated around the lecturers who had an hour to present their lectures. The teachers were given ten minutes to ask questions. A basic feature of the lectures was their high specialisation which could only be followed by teachers of the corresponding school disciplines. The programme was divided in two parts: a theoretical and a practical one. Both parts had the same function: the transmission of knowledge from the "experts" to the teachers. Teachers in all sessions were the mere recipients of knowledge about specific environmental problems such as pollution and the use of pesticides and their consequences to human health. Therefore their participation was reduced to asking a few questions.

All aspects of the programme, its structure, the kind and the nature of knowledge, the methodology, the way it faced teachers, even the stance that the organisers had from the beginning evidenced its positivist nature.

4. THE EVALUATION OF THE IN-SERVICE PROGRAMME

Guba and Lincoln defining evaluation within a "naturalistic paradigm" of inquiry. They argue that evaluation

> "...attempts to present "slice of life" episodes documented through natural language and representing as closely as possible how people feel, what they know and what their concerns, beliefs, perceptions and understandings are" (Guba and Lincoln 1988, p.78).

According to the authors the design of evaluation within the above context cannot be a pre-test - post-test activity and cannot be specified in advance. With this assumption

in mind, I decided to conduct the evaluation of the in-service programme based on teachers' participation during the sessions of the programme. An additional part of the evaluation would consist of teachers' comments during and after the programme. However, in terms of internal validity I should as well proceed with the triangulation of the data. As Hopkins suggested

> "Triangulation involves gathering accounts of a teaching situation from three quite different points of view; namely, those of the teacher, the pupils and a participant observer" (Hopkins 1992, p.68).

Thus, apart from the teacher-participants, the EE co-ordinator and one of the University "experts" could provide me with insights about the overall effectiveness of the programme. Here, due to space limitations, I will only refer to the evaluation made by teachers who participated in the programme.

As I argued before, teachers' participation was minimal, because of the nature of the programme. Thus, I could not have an account of their opinions about the programme based on this. I conducted some interviews with teachers during and after the in-service programme and on the last day I asked them to fill in some evaluation sheets. The most basic characteristic of teachers' evaluation of the in-service programme was that no-one questioned its positivistic character. They all expressed positive comments about the content and the structure of the in-service programme and they only made a few suggestions about particular aspects of it, like for example that the practical part should be more extensive or that the programme should be more. An indicative comment of the general attitude was given by two teachers when I interviewed them during the programme. In my question why they participated in the programme, they answered: "I came because I saw the names of some university experts in the programme leaflet ...thus I expected to hear something more scientific, something more than I already knew as an ordinary citizen".

5. CONCLUSIONS

While I was transcribing these interviews and I was writing the relevant chapter of my PhD, it was the second time that I remembered my friend's comment that I wrote in the beginning of this paper. Although teachers may identify a lack of communication between themselves and the "experts", they feel insecure to express their own "expertise" about their professional practice. Thus, they ask for the "experts" to transmit knowledge which is usually not related to their practice. Even in EE, where teachers have to follow different procedures that are not related with the centralised and compartmentalised nature of the Greek curriculum, they seem to give importance to the environmental part of EE instead of its educational part.

EE is not incorporated into an educational system as a radical innovation that can change the nature of the educational system, but it is influenced by the nature of this system. The consequences for the teachers are to confront the conflict that this situation imposes sooner or later and to develop a deep understanding of EE as they are becoming involved in it. The potential of EE for the transformation of the curriculum is yet to be realised.

6. REFERENCES

Fien, J. (1993) Education for the Environment. Critical Curriculum Theorising and Environmental Education. Geelong: Deakin UP

Greenall-Gough, A. (1993) Founders in Environmental Education. Geelong: Deakin UP

Guba, E.G. and Lincoln, Y.S. (1988) Effective Evaluation, San Francisco and London: Jossey-Bass Publishers

Hopkins, D. (1992) Evaluation for School Development, Milton Keynes: Open UP

Huckle, J. (1993) Environmental Education and Sustainability: A View from Critical Theory. In Fien, J. (ed.) *Environmental Education: A pathway to sustainability*. Geelong: Deakin UP

Mayer, M. (1995) Quality Indicators and Innovation in Environmental Education. In OECD *Environmental Learning for the 21st Century*. Paris: OECD

Mc Niff, J. (1988) Action Research: Principles and Practice. London: Macmillan Education

OECD (1995) Environmental Learning for the 21st Century. Paris: OECD

OECD (1994) Evaluating Innovation in EE, Paris: OECD

Robottom, I. (1990) EE: Reconstructing the Curriculum for Environmental Responsibility, *New Education*, 12 (1): 61-77

Robottom, I. (1992) Towards inquiry-based professional development in Environmental Education. In Robottom, I. (ed.) *Environmental Education: Practice and Possibility*. Geelong: Deakin UP

Robottom, I. and Hart, P. (1993). Research in Environmental Education: Engaging the Debate. Geelong: Deakin UP

Schaefer, G. (1980) Environmental Education - A New Word or a New Philosophy Teaching? In Bakshi, T.S. and Naveh, Z. (eds.) *Environmental Education. Principles, Methods and Applications.* Proceedings of the Symposium on Environmental Education at the Second International Congress of Ecology. New York: Plenum Press

Trotman, A. (1978) Ecology. The Basic Pattern of Thinking in Environmental Education. In Carson, S. McB. (ed.) *Environmental Education. Principles and Practice*. London: Edward Arnold

MAKING ISSUES-BASED ENQUIRY A REALITY IN SOUTH AFRICAN SECONDARY SCHOOL GEOGRAPHY THROUGH COOPERATIVE FIELDWORK

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Geography ought to be a vehicle for environmental education (Fien & Gerber, 1986; Fien, 1988, 1993; Huckle 1986a, 1986b; and Davey, 1995). Translating the rhetoric of environmental education into practice has methodological implications for geography teachers. If geography is to be a vehicle for environmental education in South African secondary schools, methodologies appropriate to achieving this goal need to be implemented.

Issues-based enquiry, as a participatory, learner-centred approach, offers possibilities for learners to develop awareness and understanding of environmental issues and possible ways of addressing these (Gough, 1992; Chambers, 1995). This approach represents a radical departure from the norm in South African secondary schools where the approach to teaching and learning geography is still predominantly classroom based; teacher-centred with teacher-tell and transmission being the most favoured methods of teaching; where knowledge is viewed as factual recall at the expense of conceptual understanding or skills development, and where little, if any, link is made to the real world of the learners (Van Harmelen & Irwin, 1995).

This paper explores how through implementing an issues-based enquiry using cooperative fieldwork, it is possible to develop awareness and understanding, skills and values necessary for sustainable living. Further, it is argued that within the context of multicultural South African classrooms, cooperative fieldwork enables learners from diverse backgrounds and cultures to work together when investigating and addressing controversial issues in the local environment.

Key words :

Teacher Education
Modelling
Theory Practice
Enquiry
Cooperative Learning
Fieldwork

MAKING ISSUES-BASED ENQUIRY A REALITY IN SOUTH AFRICAN CLASSROOMS THROUGH COOPERATIVE FIELDWORK

Di Wilmot

1 INTRODUCTION

The argument developed in this paper is based on the premise that geography, as a catalyst for environmental education, has methodological implications for both teachers and teacher educators. Current South African curriculum initiatives reveal exciting opportunities for geography as a vehicle for environmental education as advocated by contemporary geographies (Fien, 1988; Unwin, 1992). However, before this can be achieved, ways of translating the rhetoric into practice need to be identified, and approaches and strategies seen as appropriate for achieving these goals need to be made accessible to classroom practitioners. To this end, it is argued that teaching and learning in both pre-service and in-service teacher education programmes need to be experiential and participatory.

Issues-based enquiry, as a learner-centred, participatory approach, is seen as offering exciting possibilities through which learners can develop awareness and understanding of environmental issues and possible ways of addressing these (Gough, 1992; Chambers, 1995). The aim of this paper is to explore how issues-based enquiry can become a reality in South African geography classrooms through cooperative fieldwork in the local urban environment. The activities included in this paper, while designed for use with Grade 9 learners, have been modelled in both pre-service and in-service geography teacher education programmes at Rhodes University, Grahamstown.

2 A BRIEF OVERVIEW OF THINKING IN GEOGRAPHY AND ENVIRONMENTAL EDUCATION

Since the early 1980's, literature in geography reveals that much energy has been spent not only on affirming and justifying the worth of the subject but also on debating the form and nature of geography within formal schooling, and evolving appropriate approaches to teaching and learning geography (Bailey & Binns, 1987; Gerber & Lidstone, 1988; Rawling & Daugherty, 1996; Bailey & Fox, 1996). At the same time, Fien & Gerber (1986), Fien (1988, 1993), Huckle (1986a; 1986b), and Unwin (1992) emphasise these dimensions: the development of skills and capacities in learners, including critical thinking, the ability to communicate effectively; so that through problem solving and decision making, they are able to function effectively in the world both immediately and in their future lives; the promotion of values and attitudes - including empathy, responsibility, tolerance, stewardship and respect - necessary for sustaining life on this planet. A similar orientation to education is promulgated by environmental educators (Fien, Gough, Robottom & Spork in Fien, 1993). They contend that education *for* the environment, in contrast to education about and through the environment, includes a further dimension in that it seeks to engage learners in the active resolution of environmental issues and problems.

If we accept that education needs to play a role in developing knowledge, skills and values necessary for creating just, democratic and sustainable societies then we need to find ways of translating the rhetoric into practice. Unless strategies for achieving such are made accessible to

teachers and teacher educators, it is unlikely that these goals of education will be achieved. Wilmot (1997) claims that simply 'telling' teachers about these strategies will not suffice. Policy makers need to recognise and accept that a gap exists between articulating goals and translating them into action. Given the radical changes advocated by a new curriculum, it is argued that South African teacher education programmes need to provide experiential and participatory learning opportunities. This paper explores how, through a modelling process, it is possible to bridge the theory-practice gap. However, before proceeding with this, it is necessary to contextualise geography and environmental education within the broader processes of transformation in South African education.

3 GEOGRAPHY AND ENVIRONMENTAL EDUCATION WITHIN THE CONTEXT OF TRANSFORMATION IN SOUTH AFRICAN EDUCATION

The adoption of Outcomes-Based Education, currently being implemented in schools through *Curriculum 2005*, necessitates a transformation of both the structures and processes of education in South Africa. For geography, while this represents a radical departure from the way the subject is conceptualised and taught in schools, it opens up exciting opportunities for environmental education. Curriculum initiatives have been met with mixed response from geographers, teachers and teacher educators alike.

Geography no longer exists as a discrete subject in the curriculum, rather it is subsumed within the Human and Social Sciences and Natural Sciences Learning Areas. Van Harmelen & Boltt (1997) claim that there is the fear that integration will mean the disintegration of unique features that identify geography as a discrete form of knowledge and in so doing it will lead to a trivialisation of knowledge. They argue that if teachers and teacher educators are fully cognisant of the essential concepts of geography, this need not be the case. This has however significant implications for teacher education programmes. Many teachers and teacher educators, who by virtue of the nature of their 'training' have a sound knowledge in the sense that they have the facts about geography, know little or nothing about the nature and point of geography in education, or the construction of knowledge in and for education in a teaching/learning situation (Van Harmelen & Boltt, 1997). As a matter of urgency, ways of addressing this need to be identified and implemented in teacher education programmes.

Further, Van Harmelen & Irwin (1995) claim that in the majority of school classrooms, current geography practices are as follows: knowledge is presented as neutral, absolute and given; teachers and pupils are not encouraged to question, challenge or to critically analyse and evaluate that which is taught; teaching and learning is classroom based, teacher-centred with transmission and teacher-tell being the most favoured methods of learning, and factual recall and rote-learning are encouraged as the expense of conceptual understanding and skills development. Instead of a prescription of content to be covered; the new curriculum calls for the design of flexible and relevant programmes of learning through which learners can develop action competencies - investigative and enquiry skills; critical thinking and communication skills; problem solving and decision making skills - as well as a values and attitudes. For the majority of teachers in South Africa who were 'trained' to simply implement the previous top-down curriculum in which they had no say, the removal of traditional support structures - syllabuses detailing the content to be covered each year and textbooks interpreting the syllabus for them - the envisaged changes are positively threatening. Simply 'telling' them what to do or providing them with 'quick-fix recipes'

will not enable them to empower themselves as agents of change.

For some, the writer included, the new curriculum with its learner-centred, participatory, action-competency orientation and integrated approach is a remarkable achievement in terms of the opportunities it provides for geography and environmental education. The Human and Social Sciences Learning Area is seen as contributing to the development of responsible citizens in a culturally diverse, democratic society within a interdependent world, and equipping learners to make judgements and take appropriate action that will contribute to sustainable development of human society and the physical environment (DoE, 1997: 45). Of significance to this paper is that for the first time we have a curriculum with sufficient flexibility and scope to enable geography to be a catalyst for environmental education - provided of course teacher identify and make use of the opportunities and provided they are able to implement strategies appropriate for realising such. The issues-based enquiry outlined in this paper, suggests one possibility of how the rhetoric can be translated into practice thereby making it accessible to teachers.

The Environmental Education Curriculum Initiative (EECI) advocates a cross-curriculum and integrated approach to environmental education within all level and programmes of the curriculum; the adoption of an action competency orientation as a means through which to "... empower communities to act on environmental issues and to promote environmental ethics" and it supports programmes which reflect the principles of *Agenda 21* and international trends of education for sustainable living (Janse Van Rensburg & Lotz, 1998: 4-5). The EECI suggest practical ways of infusing environmental education into the curriculum. Useful as the guidelines are in showing what enquiry and thematic approaches look like in practice, the writer contends that unless these approaches are workshopped in a participatory manner - with teachers actually 'doing' the theory - there is little chance of theory being translated into practice.

Despite the opportunities afforded by the new curriculum, a consideration of the realities of teaching and learning in South African schools at the present time, reveals constraints which need to be addressed. However, as Simon (1992) suggests, we need to move beyond the identification of constraints to change and actively encourage the search for possibilities for change, no matter how apparently flawed the education system may be. Underpinning this is the belief that we need to reconstruct educational practices that engender a pedagogy of possibility so that transformation is possible. The modelling of an issues-based enquiry with teachers attempts to do just this.

4 MAKING ISSUES-BASED ENQUIRY A REALITY IN SOUTH AFRICAN GEOGRAPHY CLASSROOMS THROUGH COOPERATIVE FIELDWORK

4.1 Theoretical perspectives

Following a thematic/outcomes approach to learning programme development (EECI, 1998), the enquiry was designed as a unit of work in a cross-curriculum theme on 'The local environment'. Teachers were introduced to the idea of cross-curricular thematic teaching in which specific outcomes from different learning areas are clustered.

The approach to fieldwork is that of framework fieldwork, the most prominent feature of which is "the recognition that environmental questions and issues have both factual and opinions or values orientated facets. Both these facets require examination if some form of valid decision or conclusion is to be reached as a result of the work carried out in the field" (Hart & Thomas, 1986:

207). To this end, the first field activity - a land use survey - was framed by enquiry questions which focused on the 'factual' dimensions of the environment. The survey, is seen as useful and necessary in so far as it develops in learners awareness and understanding of spatial arrangements, patterns and relationships of land use, and skills such as observation and recording. At the same time, it is limited to developing an understanding and explanation of 'what is' and 'why it is thus' without focusing on the human dimension. The second activity - an issues-based enquiry - focuses on the latter dimension and is thus more opinion or values orientated. Further, whereas the land use survey was designed by the tutor, the teachers with whom these activities were modelled, were responsible for the design of the issues-based enquiry. This encouraged the teachers to think about 'what' they were going to investigate, 'how' they would do so, what techniques are appropriate for gathering the necessary information, and it encouraged them to make decisions and take appropriate action.

A cooperative learning approach using the jigsaw model was used. Cooperative learning is seen as "the instructional use of small groups so that students work together to maximise their own and each other's learning" (Johnson, Johnson & Smith, 1991: iii). Distinguishing features of cooperative group work are: learners must realise and accept that they need to rely on one another for the task to work and that for the group to succeed, each individual must accept individual responsibility for some part of the work. The jigsaw model used in the enquiry outlined in this paper is that in which 6 learners are placed in home groups, each of which is assigned a specific task. Within each home group, 3 expert pairs are formed. Each pair is responsible for one aspect of the assigned task. The success of the home group is dependent on the contribution made by each expert pair, and the overall success of the enquiry is dependent on each home group successfully performing their assigned tasks. A cooperative learning approach was selected because it facilitates the development of social skills necessary for dealing with and solving issues that confront us in our everyday lives, and it enables learners from diverse cultures to work together.

Following the model of enquiry suggested by Gough (1992) and Chambers (1995) the enquiry consisted of the following phases: planning; investigating and researching aspects of the theme; communicating and interpreting the results of the investigations; reflecting on the investigation, and taking action.

4.2 Modelling the enquiry with teachers

The theme 'The local environment' was introduced through an enviro-picture building game. The game developed awareness and understanding of land use and associated issues in an urban environment. The teachers then acquired first hand experience of the local environment through the completion of a land use survey. The findings revealed that the local business district was utilised by both the formal and informal sector. The teachers discussed the extent to which the land use reflected socio-political and economic forces at work in the town. Copies of local newspaper reports and letters to the press reflecting different perceptions of and attitudes to the informal sector were read. The idea of the informal sector as a controversial issue in the local community was thus introduced and discussed.

The teachers were asked to suggest ways of investigating firstly, the informal sector and secondly, people's perceptions of such. The following framing questions were suggested by the teachers: Who are these people? What do they do? Where are they located and what has

informed their choice of site? What are people's perceptions of them - especially the shoppers and shopkeepers outside whose shops they were located? Questionnaires and interviews were identified as appropriate tools for collecting the necessary data. Literature pertaining to the design and use of questionnaires and interviews was studied before the teachers designed questionnaires and interview schedules for use in the field. Each home group investigated a specific area of the business district in which the informal sector was active. One expert pair interviewed the informal sector; another interviewed the shopkeepers, and a third pair interviewed shoppers.

The groups reconvened in the classroom. The data was collated and analysed and written reports prepared. Each group reported its findings to the class as a whole. General trends and patterns were identified and discussed, and the findings were evaluated in terms of the claims made in the various press reports. The teachers brainstormed possible ways in which the informal sector 'problem' could be addressed and how this could translate into action. They decided to communicated the findings to a larger audience through a letter to the local press.

On completion of the enquiry, the teachers were encouraged to 'stand back' from the activity and reflect on what had been learned. They were unanimous that the practical, hands-on activity had been a worthwhile learning experience. Through it they had developed: a better understanding of the complex interactions between the physical-human and human-human environment; a plethora of skills - including critical thinking, the ability to communicate effectively, problem solving and decision making, and values such as tolerance, cooperation and responsibility. They had become actively involved addressing in a 'real' issue in their local environment. Most importantly, they felt better equipped to design and implement cross-curriculum, thematic approaches using issues-based enquiry, fieldwork and cooperative learning in their own classrooms.

5 CONCLUSION

This paper has explored the notion of geography as a vehicle for education for the environment within the new South African curriculum. It has been argued that for these goals to be achieved, ways of translating the rhetoric into practice need to be identified and appropriate strategies made accessible to teachers. A workable framework has been put forward. The writer has shown how through a modelling process in which experiential learning opportunities are provided, teachers can empower themselves to make issues-based enquiry a reality in South African schools through cooperative fieldwork.

6 REFERENCES

Bailey, P, & Binns, A.J. (Eds) (1987) *A case for geography*. Sheffield: The Geographical Association.

Bailey, P, & Fox, P. (Eds) (1996) *Geography teachers' handbook*. Sheffield: The Geographical Association.

Chambers, B. (1995) *Awareness into action: Environmental education in the primary curriculum*. Sheffield: The Geographical Association.

Fien, J, & Gerber, R. (Eds) (1986) *Teaching geography for a better world*. Brisbane: The Australian Geography Teachers' Association.

Fien, J. (1993) *Education for the environment: Critical curriculum theorising and*

environmental education. Geelong: Deakin University Press.
Gough, N. (1992) *Blueprints for greening schools*. Gould League: Prahan.
Hart, C, & Thomas, T. (1986) Framework fieldwork. In D. Boardman (Ed) *Handbook for geography teachers* (pp. 205-219). Sheffield: The Geographical Association.
Huckle, J. (1986a) Confronting the ecological crisis: Some implications for geographical education. *Contemporary Issues 2*(2), 2-13.
Huckle, J. (1986b) Geography, citizenship and political literacy. In J. Fien & R. Gerber (Eds) *Teaching geography for a better world* (pp.14-32). Brisbane: The Australian Geography Teachers' Association.
Janse van Rensburg, E, & Lotz, H. (Eds) (1998) *Enabling environmental education as a cross-curriculum concern in outcomes-based learning programmes*. (Discussion document of the EECI). Rhodes University: Grahamstown.
Johnson, D.W, Johnson, R.T, & Smith, K.A. (1991) *Cooperative learning: Increasing college faculty instructional productivity*. Washington: George Washington University.
Rawling, E.M, & Daugherty, R.A. (Eds) (1996) *Geography into the twenty-first century*. Chichester: Wiley.
Simon, R.I. (1992) *Teaching against the grain: Texts for a pedagogy of possibility*. Toronto: OISE Press.
South Africa: National Department of Education. (1997, March). *Curriculum 2005*. Pretoria: Government Printers.
Unwin, T. (1992) *The place of geography*. Harlow: Longman.
Van Harmelen, U, & Boltt, G. (1997) Reconceptualising the 'Master Classes': Towards sustainable geographical education in OBE. *Proceeding of the Commission on Geographical Education Conference* (pp. 111-120). Stellenbosch, South Africa, July 14-16.
Van Harmelen, U, & Irwin, P. (1995) Challenging geography: A South African perspective. *Geographical Education 8*(3), 35-38.
Wilmot, P.D. (1997) Translating theory into practice: A social constructivist approach to assessment in geography. *Proceeding of the Commission on Geographical Education Conference* (pp. 87-104). Stellenbosch, South Africa, July 14-16.

STUDENT ENVIRONMENTAL ACTIVISM IN THE CONTEXTS OF AGE AND GENDER

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This paper reports the findings from a study in which a specially designed environmental activism scale was administered to a sample of university students. The sample comprised five groups: four were drawn from first year undergraduates studying geography, biology, nursing and philosophy and the students in the fifth were following short continuing education courses in environmental studies. The scale distinguished between three groups: the very active ('gladiators'); intermediate; and less active ('spectators') students. From the data we were able to identify students who responded negatively to all of the items in the scale and others who responded positively to many items on the scale. Further, we were able to refine the findings to take account of age and gender and these particular findings will be discussed alongside subject specialisms.

STUDENT ENVIRONMENTAL ACTIVISM IN THE CONTEXTS OF AGE AND GENDER

Michael Isaac and Michael Williams

This is the third paper in the sequence in which we have been exploring the concept of environmental activism. Elsewhere (Isaac and Williams, 1998a), we have highlighted the important relationship between cognition and action and sought to define the principles underpinning environmental activism. We went on to describe the stages in developing a scale of environmental activism which had within it three sub-scales focused on 'gladiators', 'spectators' and persons occupying an 'intermediate' position (Isaac and Williams, 1998b). Here we review briefly the contents of these earlier reports in order to contextualise our discussion about age and gender aspects of our study.

CONTEXT

The initial stimulus for our study came from the comments made by a number of writers (e.g. Robertson and Krugly-Smolska, 1997) about the distance between environmental cognition and environmental action. We explored this distance with reference to a list of eight approaches to environmental education (classical humanism; scientific; recreational; vocational; citizenship; ethical; economic; and legal) that we identified and briefly described with specific reference to adult education. We proceeded to design and pilot test a scale of environmental activism that owed much to a hierarchy of political participation defined by Milbrath (1965). He classified persons into three groups, what he called 'gladiators', 'spectators' and an intermediate category. We developed a 17-item scale that comprised seven 'gladiatorial' activities, four spectator activities and six intermediate or transitional activities.

The scale was administered to first year undergraduates from four subject areas (biology, geography, nursing and philosophy) studying in the same university in the Spring of 1998. We hypothesised that students from the environmental subjects biology and geography would be more environmentally active than those from the other subjects. In our earlier paper (1998b) we reported on the student responses by subject specialism to each of the items in the scale. In this paper we focus initially on the levels of response in the subject areas with particular reference to age and later we look at findings from a sample of adults following short continuing education courses in environmental studies in the same university.

INACTIVITY

In Table 1 we record the number of undergraduates by subject who, in the previous twelve months, had not: put an environmental poster in a room at their place of residence; put an environmental sticker on their car windscreen or a window at their place of residence; worn an environmental badge; or attempted to persuade another person to take a more active interest in an environmental issue or issues. We can see that geography students were most active followed by biology with nursing and philosophy being the least active.

TABLE 1: NUMBER AND PERCENTAGE OF UNDERGRADUATES BY SUBJECT WHO RECORDED ZERO ENVIRONMENTAL ACTIVITY

	Total number of under-graduates	Number recording zero	Percentage recording zero
Biology	185	40	21.62
Geography	121	22	18.18
Nursing	66	18	27.27
Philosophy	53	20	37.73

When we consider the gender of the students in each of the specialisms (Table 2) we find that male biology undergraduates are less active than females in the same subject. A far higher proportion of biology males are inactive compared to geography males though this finding is reversed for females. The least active males are to be found in philosophy and the least active females are to be found in nursing.

TABLE 2. UNDERGRADUATES BY SUBJECT AND GENDER WHO RECORDED ZERO ENVIRONMENTAL ACTIVITY

	Total number of under-graduates	Number of males recording zero*	Percentage of males recording zero	Number of females recording zero*	Percentage of females recording zero
Biology	185	28 (87)	32.18	12 (98)	12.24
Geography	121	12 (67)	17.01	10 (54)	18.51
Nursing	66	1 (6)	16.66	17 (60)	28.33
Philosophy	53	15 (35)	42.85	5 (18)	27.77

*Figures in brackets indicate the total number of males and females in the sample by subject

ACTIVITY

Turning to the higher level of environmental activities, what we have called the gladiatorial activities, we can see in Table 3 that the highest proportion of students in this category are to be found in biology and geography, though we would draw attention to the small numbers of students in most of the cells.

As can be seen, Table 4 comprises four tables each of which shows the kind of gladiatorial activities engaged in by the students by gender in the sample. Notice that in the biology group, where more males were represented in the gladiator group than female, women and men were most active in participating as volunteers in environmental activities and subscribing to environmental organisations.

TABLE 3. PERCENTAGE OF UNDERGRADUATES FITTING INTO THE GLADIATOR CATEGORY BY SUBJECT AND GENDER

	Total under-graduates	Female total	Number of gladiators	% gladiators	Male total	Number of gladiators	% gladiators
Biology	185	98	17	17.34	87	9	10.34
Geography	121	54	4	7.40	67	3	6.68
Nursing	66	60	2	3.33	6	0	0
Philosophy	53	18	1	5.55	35	2	5.71

TABLE 4A. BIOLOGY FIRST YEAR UNDERGRADUATES ENGAGED IN GLADIATORIAL ACTIVITIES

	Males n = 9	Females n = 17
1. Been an officer in an environmental organisation	1	2
2. Engaged in fund raising for an environmental issue	7	13
3. Been a subscribing member of an environmental organisation	8	14
4. Participated in direct action associated with an environmental issue	5	13
5. Organised a petition relating to an environmental issue	1	4
6. Spoke from the floor at an environmental meeting	0	0
7. Participated as a volunteer in an environmental activity	9	17

TABLE 4B. GEOGRAPHY FIRST YEAR UNDERGRADUATES ENGAGED IN GLADIATORIAL ACTIVITIES

	Males n = 3	Females n = 4
1. Been an officer in an environmental organisation	0	0
2. Engaged in fund raising for an environmental issue	3	1
3. Been a subscribing member of an environmental organisation	1	2
4. Participated in direct action associated with an environmental issue	2	4
5. Organised a petition relating to an environmental issue	0	1
6. Spoke from the floor at an environmental meeting	0	0
7. Participated as a volunteer in an environmental activity	3	4

In Table 4B we can see that geography women were most active in participating as volunteers and participating in direct action while men were most active in participating

as volunteers and engaging in fund raising. Figs. 4C and 4D show the very small numbers of students overall in the gladiator category and the lack of any strong pattern in their responses.

TABLE 4C. PHILOSOPHY FIRST YEAR UNDERGRADUATES ENGAGED IN GLADIATORIAL ACTIVITIES

	Males n = 2	Females n = 1
1. Been an officer in an environmental organisation	0	1
2. Engaged in fund raising for an environmental issue	1	0
3. Been a subscribing member of an environmental organisation	2	0
4. Participated in direct action associated with an environmental issue	2	1
5. Organised a petition relating to an environmental issue	1	1
6. Spoke from the floor at an environmental meeting	0	0
7. Participated as a volunteer in an environmental activity	2	1

TABLE 4D. NURSING FIRST YEAR UNDERGRADUATES ENGAGED IN GLADIATORIAL ACTIVITIES

	Males n = 0	Females n = 2
1. Been an officer in an environmental organisation	0	1
2. Engaged in fund raising for an environmental issue	0	2
3. Been a subscribing member of an environmental organisation	0	1
4. Participated in direct action associated with an environmental issue	0	1
5. Organised a petition relating to an environmental issue	0	1
6. Spoke from the floor at an environmental meeting	0	0
7. Participated as a volunteer in an environmental activity	0	1

THE AGE FACTOR

Our presentation of findings from the four undergraduate groups has not included any analysis by age. Suffice it to say that the average ages of these full-time students by subject specialism were: biology 19 years, geography 19 years, nursing 25 years, and philosophy 20 years.

Late in the Spring 1998 we administered the same scale to three groups of persons attending short continuing education courses in environmental studies. The three classes were attended by 14 students (10 men and 4 women), 10 (all women) and 9 (2 men and 6 women) respectively. The average age of these part-time students was 57 years with the youngest being 29 and the eldest 71.

The environmental activities most frequently referred to by this group were signing a petition related to an environmental issue and wearing an environmental badge, both referred to 19 times. Only three (2 men and 1 woman) of the group (9%) could be described as gladiators and 4 (3 women and 1 man), scoring zero on the scale (12%), could be described as inactive. The figure for environmental inactivity is far lower than that for the undergraduate respondents. The older students appear to be more environmentally active than undergraduates in geography, philosophy and nursing.

CONCLUSION

It is important to recognise the limits of the environmental activism scale dictated by its origins in research in political participation. It is also important to acknowledge the limitations of the samples of students used in this study. Not only are they limited in size but the undergraduates also represent one particular year and reflect the peculiarities of that particular cohort. Despite these obvious limitations, we would suggest that the study has identified patterns of environmental activity that differ by subject specialism and gender within the specialisms. This information is descriptive in character and we have not engaged in any qualitative studies to follow up any of the data in order to gain some understanding of the reasons for the patterns. There is scope for modification of the scale and for further research into environmental activism with different age cohorts and subject specialisms as well for longitudinal studies to test out the origins and durability of the patterns.

REFERENCES

Isaac, M. and Williams, M. (1998a) Conceptual Foundations of Environmental Education in the Context of Lifelong Learning, a paper presented at the Sixth Annual International Colloquium on Education (*Bringing Education to People: the Challenge of Lifelong Learning*) held at the University of Wisconsin-La Crosse, April.

Isaac, M. and Williams, M. (1998b) Developing a scale of environmental activism, a paper presented at the International Geographical Union-Commission on Geographical Education Symposium, *Culture, Geography and Geographical Education*, Oporto, August.

Milbrath, L. W. (1965) *Political Participation: How and Why do People Get Involved in Politics?* Chicago:Rand McNally.

Robertson, C. L. and Krugly-Smolska, E. (1997) Gaps between advocated practices and teaching realities in environmental education, *Environmental Education Research*, 3 (3) 311-326.

MUSEUM EVALUATION AND THE "ECOLIA" PROJECT

Jack H Iguchi

1. INTRODUCTION

The term "environmental education"has been aroused for a long time. However, it is no exaggeration to say that the educational imparts of environmental education seems to be limited. Hence, this author tried to find reasons for this through his MA and PhD researches, then he concluded that, very often environmental education tends to decline too much towards technocentric or ecocentric perspective (see job 1995). Therefore, he suggests that environmental education through museums (including botanical gardens, zoological parks, aquaria, planetaria, historical societies and historic houses and sites) (Burcaw G., 1990) should be very useful since they can act as bridges between school education and field studies. In other words, a museum has the responsibility to raise public awareness of environmental issues as community education by means of real objects and personal experiences using their five senses that is vision, hearing, smell, touch and even taste. However, it is not so easy for museums to reach their educational aims and targets, because, as in other fields, museums also have to face many other issues including policy problems (Reeve J. 1990) and the methods of effective exhibitions. That is the reason for writing this paper suggesting some ideas for an effective method for exhibitions in terms of environmental education which is based on his research of the Natural History Museum (Iguchi1995).

2. EXHIBITION PLAN AND EVALUATION (TCRD SYSTEM)

This idea has been drawn from a radio transmitter-receiver system, and a remote control system. The reason for using these systems for explaining an approach to planning exhibitions and evaluation is that there is an analogy between the two, which will be discussed in detail below. The term "TCRD" comes from 4 capital letters of "Transmitter"; "Carrier"; "Receiver"; and "Drive". Each of the 4 stages are explained as follows.

2.1 TRANSMITTER (MESSAGE/SETTING UP THE EXHIBITION)

First of all, "power source" (or funding for setting up an exhibition) is vital to drive the transmitter, and this part should be argued from different angles in terms of

budget which might come from the Government, local authorities, sponsors and entrance fee to set up and allow the exhibition to thrive. Secondly "signal" (message) suggests the subject matter input by specialists in part through their publications. Thirdly the message is sent to the "modulator" which modulates the message in order to equip on the "carrier" that is the exhibition and other educational materials such as take-away texts; quiz sheets, considering affective and cognitive effects made by mainly curators, educators and designers. Before and during planning the exhibition, front-end evaluation and formative evaluation is needed in terms of the subject matter about the message; the exhibition design using the theory of environmental psychology; and educational effects using the theory of cognitive psychology.

2.2 CARRIER (EXHIBITION)

Exhibitions consist of media and messages like radio waves consisting of carriers and signals. The most important task in this stage is to send the message to a receiver (visitor) efficiently and with minimum loss. To achieve this, a summative evaluation should be needed which examines the subject matter; the exhibition design considering environmental psychology; and educational effects considering cognitive psychology.

2.3 RECEIVER (VISITOR)

In this stage, "Receiver" that is "visitor" can get the message with affective and cognitive effects through "Detector" that is 5 senses organs: vision (eyes); hearing (ears); taste (tongue); touch (skin); and smell (nose): Then the information is stored in "memory", and then the visitor can retrieve the message from his/her memory organs that is the stage of "output" for the signal. In this stage also summative evaluation is needed to adjust the content of the exhibition to the target audience, and also to rethink how to create educationally effective exhibits which visitors can retain in their memory for a long time.

2.4 DRIVE (INFLUENCE OF THE MESSAGE ON A VISITOR'S LIFE)

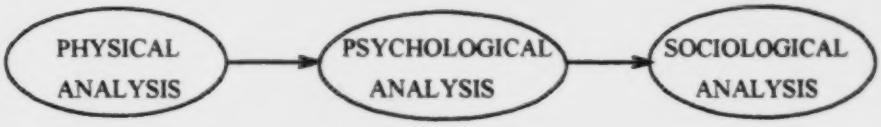
In the case of remote control systems, signals as "output" can drive a target instrument and similarly, in the case of visitors, the information obtained by visitors from the exhibition may influence their lives. For instance it may reinforce their work at school or might change their life-styles somewhat towards saving the earth in the case of ecology exhibitions. This stage is named "Drive" and is the ultimate aim for any exhibition. Hence a "follow up survey" is needed as summative evaluation

and the positive and negative results are informed through a feedback route to the staff or other specialists concerned. All these stages are shown diagrammatically in figure 1.

3. SEQUENCE FOR THE ANALYSIS OF EXHIBITIONS (PPM SYSTEM)

One of the sequences for the analysis of ecology exhibitions can be summarised as "PPS system" coined by this author. The term "PPS" comes from the 3 capital letters that is "Physical analysis"; "Psychological analysis"; and "Sociological analysis". Physical analysis is the analysis of the background and physical conditions of an exhibition. Psychological analysis is the analysis of visitors' behaviour in an exhibition, and their attitudes towards the exhibitions. Sociological analysis is the analysis of visitors' sociological influences from an exhibition. The sequence is shown as follows.

SEQUENCE FOR THE ANALYSIS OF EXHIBITIONS
(PPS SYSTEM)



4. FUTURE ROLE OF ECOLOGY EXHIBITION - ECOLIA PROJECT

Firstly, new ideal ecology exhibitions or museums must be made popular with the general public. The term "museum" has a somewhat old image, hence instead of it, the term "ecolium" that means "ecology museum" has been created. The aim of the ecolia (ecolium's plural) can be to "Save the Earth" and in particular to conserve animals, plants and minerals. The content of such exhibitions for achieving the aim are mainly "ecology" describing vulnerable biosphere and "earth science" describing atmosphere; hydrosphere; and lithosphere which are vital ingredients for life. Also it is vital to introduce "human impacts on the environment" through practical issues.

In addition, an ecolium is not necessarily within a building. As the definition of museums, the nature of the ecolia includes mobile/itinerant exhibitions; field study centres; and natural parks. Furthermore, an ecolium does not exist for just showing exhibitions but behind the scenes, as many existing museums have done, research into the discipline must be conducted, and the results must be exchanged with another ecolium to make progress as an academic institution. Hence ecolia are a form of

"earth conservation centres".

Secondly, a network system of ecolia must extend to other kinds of museums. For example, science museums have a responsibility to educate the peaceful use of hi-technology for the earth, like the Science Museum in London which has some conservation projects (Insley J., 1991); history museums can appeal for conservation of heritage sites like Ironbridge Museum in the UK; and art museums can also educate for the conservation of nature and culture such as those in the National Gallery in London, using some artefacts.

Thirdly, this huge network ideally would extend throughout the world possibly named "World Ecolia Network System" (WENS), and the information must be exchanged between them and must be shown to the public through ecolia, other museums and exhibitions, or mass media like broadcasts, newspapers and magazines. Also holding regular international conferences is essential to improve such ecolia and their related research projects, and to safeguard the vulnerable earth which is the indispensable home of us all now and in the future. In effect, arguably the biggest ecolium is the earth itself. The project is shown diagrammatically in Fig 2.

5. SUMMARY

Within many methods of environmental education, this author sees that museums have the special role of raising visitors' environmental awareness. He then suggests some methods such as TCRD system, PPS system and Ecolia project in order to save our vulnerable planet and keep it whole for the 22nd century.

6. BIBLIOGRAPHY

Burcaw G.E., 1990. *Introduction to Museum Work*, asslh (The American Association for State and Local History), Nashville: 10.

Iguchi H Jack 1995. *Environmental Education through Museums - A case study of the Ecology Exhibition in the Nature History Museum, London.* (PhD thesis) Institute of Education, University of London: pp 432-444.

Insley J., 1991. Environment vs Technology, *Museum Journal, Sep.,1991*: 16.

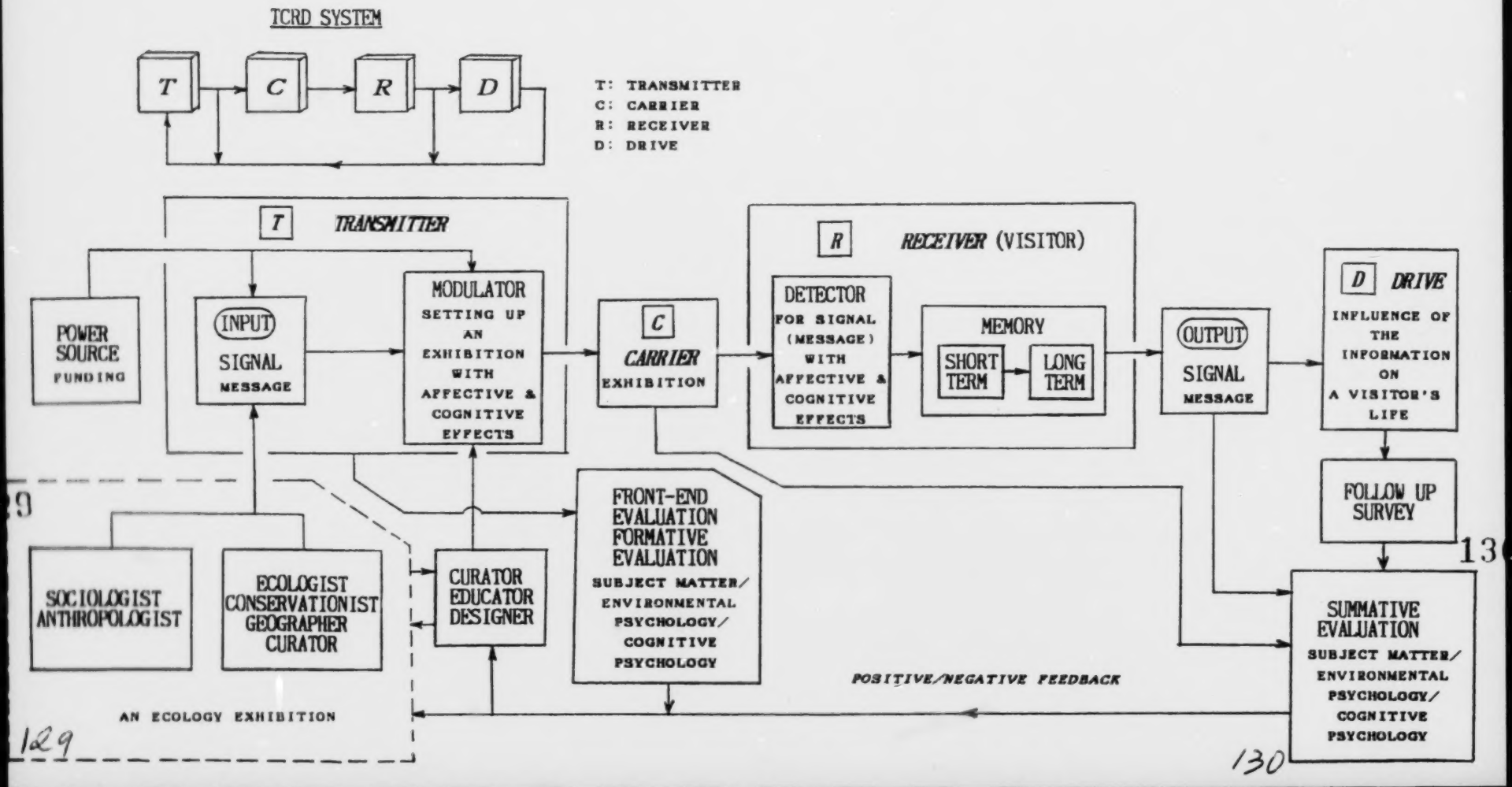
Job D.A., 1995. Geography and Environmental Education - an exploration of perspectives and strategies, in Kent W.A., Lambert D., Naish M. & Slater F. (eds), *Geography in Education*, Cambridge University Press, 22-49.

Reeve J., 1990. *Current Perspective in Museum Education*: 1,4 (from a panel discussion in Canada House, London. 26 Apr 1990).

EXHIBITION PLAN & EVALUATION

Fig 1

TCRD SYSTEM



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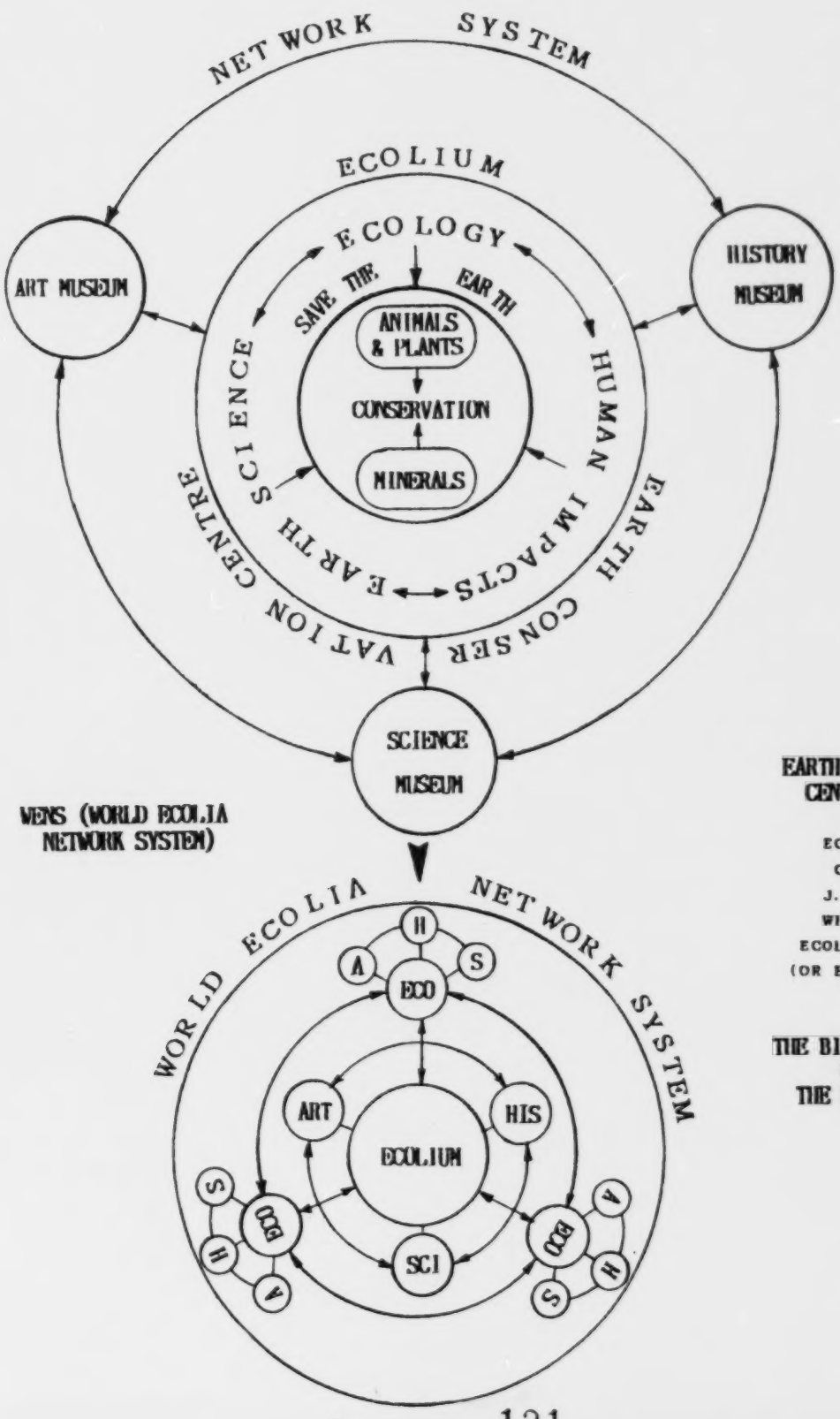
ECOLIA PROJECT



EARTH CONSERVATION CENTRE=ECOLIUM

ECOLIUM WAS COINED BY J. H. IGUCHI WHICH MEANS ECOLOGY MUSEUM (OR EXHIBITION)

THE BIGGEST ECOLIUM CAN BE THE EARTH ITSELF

ENVIRONMENTAL LITERACY AND DECISION MAKING : A CHALLENGE FOR LOW LITERATE SOCIETIES?

Sabiha DAUDI

The Ohio State University, School of Natural Resources

A large number of practitioners in the field of environmental education define environmental literacy in cognitive terms. As Disinger and Roth (1992) suggest, these practising educators believe that knowledge is a pre-condition of thoughtful behaviour and action. Disinger and Roth also declare that formal education systems usually limit their operational objectives to the attainment of knowledge and skills related to their effective and efficient acquisition and do not actively promote the pro-active development of "responsible environmental behaviour" as described by Hungerford (1987). Observations of individual and societal environmental behaviour belies the assumption that behavioural change follows directly from development of necessary knowledge and skills (Iozzi, 1989). Drawing from this school of thought and keeping the role life experiences and culture plays in mind, it can be safely assumed that positive attitudes leading to responsible behaviour of citizens towards the natural environment are more than the ability to be "scientifically knowledgeable" about the environmental issues. Ecocitizenship requires that all citizens understand their rights and responsibilities when environmental decision making is a critical challenge for them.

This presentation is based on the premise that environmental educators need to learn to communicate with low literate societies of the world using non written techniques if the goal is for each individual to understand their environmental concerns and practice knowledgeable decision making and critical thinking skills. A model for promoting environmental literacy in low literate communities of the world, not necessarily the developing countries, will be shared with the participants using an interactive approach.

ENVIRONMENTAL LITERACY AND DECISION MAKING : A CHALLENGE FOR LOW LITERATE SOCIETIES?

Sabiha S. Daudi

INTRODUCTION:

The definition of the term 'literacy', which is also defined by some educators as the process of changing the method of communication, has expanded well beyond what was generally understood as 'the ability to read and write and to communicate with written or printed symbols' in recent years. The definition has now evolved to include the concepts of enabling communities to participate in daily decision making processes and empowering them to form these decisions on the basis of real-life experiences (Freire, 1970). This challenge can also relate to notions such as adult literacy, visual literacy, cultural literacy and so on. Environmental literacy has emerged as an important discipline in recent decades. According to Wrigley (1993), practitioners in innovative adult *English as a Second Language* programs have realized that [any kind of] literacy education is most effective if it is tied to the lives of the learners and reflects their experiences as community members, parents, and participants in the workforce. It stands to reason that this social context is also true for promoting environmental literacy in all sectors of society.

Throughout the world, almost 800 million people are non- or low literate, mainly due to socioeconomic reasons rather than because of low intelligence. Yet, this vast majority manages to communicate with each other and conduct their daily business in many spheres of life. Quite often, the written word is not used. The communication is usually oral and contracts are made with verbal agreements, without paper (Jean-Paul Hauteucoeur, 1994). Most of these people have low [or no] literacy skills, have average IQs and function well by compensating in other ways for their lack of literacy skills (Doak et.al., 1996).

ENVIRONMENTAL LITERACY

Formal literacy

A number of literacy organizations have recognized the need for decision making processes that are to be internalized by the learner. This is evident from the mission statement of Literacy South - a leading literacy organization in the U.S. which declares that "We work to support those people and organizations in the South who are committed to a shared discovery of literacy as a tool for achieving democratic communities and personal growth.. . . we help learners and teachers realize their own power and the power they have to change the world around them".

At this point, it is important to understand that not all citizens have an equal opportunity to attend formal educational institutions where the skills required to acquire factual knowledge are developed. More than half of the world population lives in developing countries and these countries have [a number of] environmental problems in common related to such factors as their ecological conditions, their lack of economic vitality, and poverty of their people. Although these factors also exist in the industrialized countries, their magnitude and impacts are more severe in the Third World (The Pakistan NCS, 1992).

Environmental literacy defined

Environmental literacy as defined by Roth (1992) establishes that "Environmental literacy should be defined . . . in terms of observable behavior. That is, people should be able to demonstrate in some observable form what they have learned - their knowledge of key concepts, skills acquired, disposition towards issues, and the like". However, a major challenge for environmental educators here is, how can environmental literacy be promoted in low literate societies where knowledge of key concepts and formal literacy skills are not well developed. An example here is *global climate change* - a complex issue that is linked to many interconnected environmental phenomena. Can a learner with low literacy skills even begin to understand the complex chemical reactions? A bigger question is, does he or she need to? Or will it be enough to highlight simpler issues such as our personal choices in daily life that could be critical to *global climate change.*

According to Disinger and Roth (1992), environmental literacy is essentially the capacity to perceive and interpret the relative health of ecosystems and take appropriate action to maintain, restore, or improve the health of those systems.

A large number of the practitioners in the field of environmental education define environmental literacy in cognitive terms. As Disinger and Roth (1992) suggest, these educators believe that knowledge is a pre-condition of thoughtful behavior and action. Disinger and Roth (1992) also declare that our educational systems usually limit their operational objectives to the attainment of knowledge and skills related to their effective and efficient acquisition; these education systems do not actively promote the pro-active development of "responsible environmental behavior" as described by Hungerford (1987). Observations of individual and societal environmental behavior also belies the assumption that behavioral change follows directly from development of necessary knowledge and skills (Iozzi, 1989). Drawing from this school of thought, we can safely assume that positive attitudes leading to responsible behavior of citizens towards the natural environment are more than the ability to be "scientifically knowledgeable" about the environmental issues.

Environmental education and environmental literacy

In exploring the international arena for concepts underlying environmental literacy, it is evident that creation of an environmentally literate citizenry is considered to be a major goal of environmental education. This view is based on declarations of some of the key international conventions in the history of environmental movement. For example, the definition of environmental education developed at a workshop sponsored by UNESCO/UNEP in Belgrade, Yugoslavia in October 1975 claims that:

> "Environmental education is a process aimed at developing a world population that is aware of and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, motivations, commitments, and skills to work individually and collectively toward solutions of current problems and the preventions of new ones." (Belgrade Charter, 1975)

Further expanded in another intergovernmental conference held at Tbilisi, Georgia, USSR in 1977, the aim of environmental education was recommended as:

> ". . . to create individuals who acknowledge the fact that the natural environment and man made environment are profoundly interdependent [and to]
>
> . . . prepare the individual for life through an understanding of the major problems of the contemporary world, and the provision of skills and attributes needed to play a productive role towards improving life and protecting the environment with due regard given to ethical values." (UNESCO/UNEP, 1977)

Nearly two decades later, a think piece entitled *Educating for a viable Future: A multi disciplinary vision for concerted action* was developed during an international conference on Environment and Society: education and public awareness for sustainability hosted by UNESCO in Thessoliniki, Greece in 1997. A draft declaration based on the work of the United Nations Commission for the Sustainable Development and under the continuing activities of Agenda 21 (Orellana, 1998) suggests that:

" The concept of sustainability encompasses not only environmental issues but also issues of poverty, population, health, food security, democracy, human rights and peace. In the final analysis, sustainability is an ethical and moral imperative which implies respect for cultural diversity and traditional knowledge (page 2)" (Thessalonika Declaration, 1997).

Levels of environmental literacy

In order to address the assessment of observable behavior that could indicate better personal choices, Roth (1992) proposes the identification of three levels of environmental literacy:

- Nominal, indicating "ability to recognize many of the basic terms used in communicating about the environment and to provide rough, if unsophisticated, working definition of their meanings";
- Functional, indicating "a broader knowledge and understanding of the nature and interaction between human social systems and other natural systems"; and
- Operational, indicating "progress beyond functional literacy in both the breadth and depth of understanding and skills."

Achieving any level of environmental literacy requires a commitment from motivated learners who are capable of making intelligent daily decisions irrespective of their levels of formal literacy skills.

Given this scenario, where development of environmentally literate citizenry and sustainable management our natural resources is the ultimate goal, what are the traits of environmentally literate citizens, is it possible to know when one is environmentally literate, and what are the variables for a 'responsible environmental behaviour (REB)' model for low literate societies?

DISCUSSION

If we accept the premise made by the regional, national and global forums on environmental education that all citizens need to have some level of environmental literacy in order to demonstrate responsible environmental behaviour and better decision making skills, then we need to explore channels of communication that are traditional for communities with low formal literacy skills. Generally, the non traditional communication channels include print and electronic media, and more recently, the world wide web. The challenge here is, how does one reach out to low literate communities in order to highlight local environmental concerns and encourage them to be more involved in decision making and policy development processes using traditional channels of communication?

The model

The model (Figure 1) presented here highlights four dimensions that need to be considered when planning programs for low literate communities. Any strategic plan will need to take into consideration social, cultural, economical and political climate of the community.

Social elements that may influence environmental decision making could include motivation or lack of it, relevance to daily life, and internalization of locus of control and the ability to impact life in general. Cultural barriers or gateways could be effected by involvement of community leaders, and willingness to act on decisions made will be influenced by how the concerns have been communicated to the community. Economical conditions is an important aspect to be

considered in low literate societies as these communities also tend to be less privileged. To make environmental issues visible, the strategy needs to include financial incentives, willingness on part of the communities to pay, and most important of all, alternatives available for management of natural resources. Political will will be dependent on sustainability of past efforts. It is necessary that communities are aware of, understand and address external locus of control as this will determine the success or failure of the program.

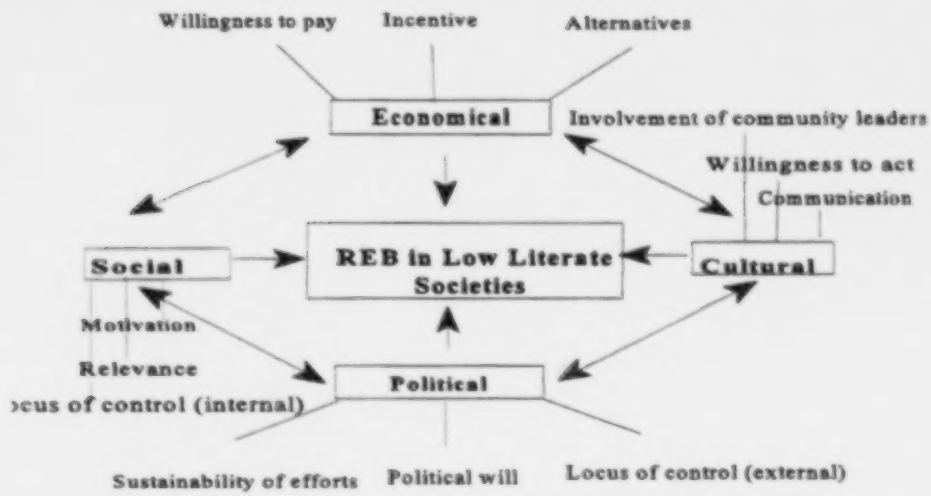


Figure 1: A model of Responsible Environmental Behaviour (REB) in low literate communities

CONCLUSION

As recognized by Agenda 21 (1993), " Education is critical for promoting sustainable development and improving the capacity of people to address environmental and development issues. . . To be effective, environment and development education should deal with the dynamics of the physical, biological, social, economic and spiritual environment (p.293)". Literacy education, be it formal or environmental, thus becomes a very important part of this holistic view.

Environmental education can play an important role in promoting environmental literacy as its goals include more than acquiring information. It is driven by a mission: to produce a concerned citizenry that is intellectually and psychologically able to understand environmental concerns of its community and is prepared to make positive choices that could reduce impacts of our life styles on the natural environment.

The model (Daudi, 99) presented in this paper suggests strategies for negotiating a few challenges that are prevalent on low literate communities in order to increase levels of environmental literacy in these communities.

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LIST OF REFERENCES

Disinger, J. F., and Roth, C. E. (1992) *Environmental Literacy*. Columbus, OH: ERIC/CSMEE.

Doak, C.C., Doak, L.G., and Root, J.H. (1996) *Teaching Patients wit Low Literacy Skills*. Philadelphia: J.B. Lippincott Company.

Freire, P. (1970) *Pedagoggy of the Oppressed*. New York: Continuum.

Hautecoeur, J-P Ed. (1994) *Alpha 94: Literacy and Cultural Development Strategies in Rural Areas*. Toronto: Culture Concepts Publishers.

Hungerford, H. R. (1987) Environmental Education and Student Behaviour In J. F. Disinger (Ed.) *Trends and Issues in Environmental Education: EE in School Curricula*. Columbus, OH: ERIC/CSMEE.

Iozzi, L. A. (1989) What Research says to the Educator: Part One, environmental education and the affective domain. *Journal of Environmental Education, 20(3), 3-9*

Ornella, I., Fauteux, S. (1998) *Environmental Education: Tracing the High Points of its History*. Montreal: Universite du Quebec a Montreal.

Roth, C.C., (1992) *Environmental Literacy: Its roots, evolution, and directions in the 1990s*. Columbus, OH: ERIC/CSMEE

Sitarz, D., Ed. (1993) *Agenda 21: The Earth Summit Strategy to Save Our Planet*. Colorado: Earth Press.

The Pakistan National Conservation Strategy (1992) Karachi, Pakistan: Government of Pakistan/Journalist Resource Centre/ IUCN- The World Conservation Union.

Wrigley, H. S., (1993) *Innovative Programs and Promising Practices in Adult ESL Literacy*. Washington, DC: National Clearinghouse on Literacy Education.

THE ROLE OF WOMEN'S SOCIAL REPRESENTATIONS IN AN URBAN ENVIRONMENTAL EDUCATION PROGRAMME IN MANAUS, AMAZONAS, BRAZIL

Christine STOREY

PhD Student, Institute of Education

This research took place between 1994 and 1996, while I was working on the project INPA and Society for the Environmental Education Work Group (EEWG) at the National Institute for Amazon Research (INPA), in Manaus, Amazonas, Brazil. INPA and Society was an environmental education project with communities adjacent to INPA's protected areas. The Vale was the first community. In order to gain access to the community the EEWG carried out a social and economic survey of a sample of the community's residents, in 1994. In the survey the women residents said that they wanted to form a group where they could discuss personal issues pertinent to them and learn new skills. In response, I offered technical courses and discussions for the women using INPA's scientific research knowledge. This experience led me to believe that it is inadequate to carry out a community programme that only transfers knowledge and does not take into account the participants' perceived needs and perceptions. Therefore I was not satisfied with the courses as they were the transfer of scientific knowledge, rather than looking at the women's environmental problems. A search led me to believe that Moscovici's (1978) theory of social representations could be an appropriate model for my attempts to understand if : *the women's social representations, understood as common sense theories, impact on their participation in community participatory programmes for environmental education.* The research methods used were a questionnaire, participant observation in the Vale community, individual semi-structured interviews and focus groups. These were carried out in three different research locations, the community, INPA and on field trips.

Key Words :

Environmental Education
Environmental concepts
Social representations
Women's groups
Community programmes
Dialogical methods.

THE ROLE OF WOMEN'S SOCIAL REPRESENTATIONS IN AN URBAN ENVIRONMENTAL EDUCATION PROGRAMME IN MANAUS, AMAZONAS, BRAZIL

Christine Storey

1 INTRODUCTION

1.1 Context

I was working on a community environmental education programme, *Women in Action*, with a women's group at the National Institute for Amazon Research (INPA) in Manaus, Amazonas, Brazil when I encountered the theory of social representations (Moscovci 1978).

1.2 My role

As co-ordinator at that time I was not satisfied with the programme *Women in Action*, as I believed it was more concerned with the transfer of knowledge than with the construction of knowledge to foster environmentally aware citizens. The latter is what I believe to be the focus of environmental education. I came to the conclusion that in order to construct knowledge within the women's group, I needed to understand better their common sense knowledge of the environment. In other words, to understand what the environment means to the women; this is where the theory of social representations was applicable.

1.3 Rationale

The rationale for my conclusions is as follows:

Firstly, I believe that when we think about the environment it is necessary to consider it as a combination of the natural, built and social environments, which cannot be separated as they are intertwined. Therefore, if environmental education is to propose alternative ethical solutions for environmental problems that exist in contemporary society it must be: *a social practice that attempts to find solutions for environmental problems and improve relationships between social, natural and built environments. This it achieves through localising problems, inequalities and oppressions and by the fostering of environmentally aware citizens. When these problems have been identified, the environmentally aware citizens together will find solutions for them.*

Secondly, social representations are, as De Castro (1995, p.187) succinctly defines them, common sense knowledge that is shared in the social world, common sense knowledge being the basis of individuals' everyday lives, formulated through communication and co-operation. Social representations are not static they are ever changing. This is why social representations are not of an object; the representation is the object, as objects take on different meanings through different social representations. A tree for example represents an organism for biologists, an object to be destroyed in order to provide an income for loggers and, an object to be preserved in order to provide an income for rubber tappers. These three social representations of a tree offer different understandings of and relationships with the object, the tree. The tree becomes different in the course of different interactions; what is important is the representation that affects the way the object is seen. This is why I came to the conclusion that by understanding the women's social representations I could better comprehend their understanding of the environment. This in turn allowed me to correlate how the women's social representations impacted upon their participation in a community environmental education programme. The information obtained was to be used to assist in revising the aims

of the *Women in Action* programme, permitting it to work towards the fostering of environmentally aware citizens, rather than just the transfer of information.

Thirdly, I did not work with a women's group because I believe that in order to save the environment from human exploitation we need to equate women with nature and introduce a universal notion of women as "earth mothers". This I believe returns to the notion that gender is a biological phenomenon. On the contrary, I agree with De Barros Lima (1994, p.76) who argues that both men and women have the ability to raise children and "turn the raw into the cooked". The reason why I worked with a women's group was that data from the initial survey carried out in the Vale community to obtain access and a picture of its social reality identified two groups interested in working with the Environmental Education Work Group: women and adolescents.

2 FOCUS AND AIMS OF RESEARCH

2.1 Three focuses of the research

- Exploring the function of community participatory programmes centring on environmental education.
- Examining the use of the theory of social representations to illuminate participants' understanding of the environment.
- Considering how an understanding of the participants' social representations can assist a programme to be participatory and not just concerned with the transfer of information.

2.2 Three aims of the research

- To suggest a different approach for participatory programmes to enable facilitators to better achieve their objectives, centring on environmental education. I believe that these objectives should be bottom-up, rather than top-down, with the aim of fostering environmentally aware citizens.
- To test weather the approach for participatory programmes could be through understanding the participants' social representations, which in turn could facilitate an awareness of the participants' common sense knowledge, from which a bottom-up approach for the programme could be planned.
- To illuminate the absence of a gender perspective in environmental education, as I suggest that environmental education cannot achieve its goal of universal participation without taking into account inequalities, including gender differences.

On achieving these aims I do not intend to offer a "recipe book" with instructions on how participatory programmes should take a bottom-up approach. This I argue would be difficult to achieve as no single approach is uniquely valid and the choice of approach should vary according to each social situation. Instead, the principal aim of this thesis is to propose theoretical and methodological perspectives that could assist facilitators to explore and achieve a bottom-up direction and function for their participatory programmes.

3 RESEARCH QUESTION

3.1 Main question

Can women's social representations, understood as common sense theories, impact on their participation in a community environmental education participatory programme?

3.2 Subsidiary questions

- What are the social representations of a group of urban women in Manaus in relation to their environment?
- How do these women locate themselves within their environment?

- How are these social representations constructed in the light of overarching social and environmental questions, problems and issues that can be argued as having a significant impact upon the women's lives?
- Is it necessary and/or possible for the women to develop a critical consciousness about their situation in society?

4 METHODOLOGY

4.1 Methodological framework

The position I have taken is that the actors' common sense theories are important, as they impact on their understanding of social reality. The actors' understanding of social reality in turn impacts on their interactions with the world and others; as such, it affects social reality and structures, which in turn impact on the actors understanding. Therefore, in order to understand reality, as Flick (1998, p.24) suggests, it is necessary to understand the relationship between implicit social knowledge, individual knowledge and actions.

4.2 Approach adopted

The position taken for this research indicates the requirement of an interpretative rather than a positivist approach. In stating this choice I do not propose a dualism between interpretative and positive approaches, rather that the focus and aims of this research require an interpretative approach.

4.3 Research perspective

A feminist perspective has been taken to illuminate women's experiences and work towards ending their unequal social position. Although qualitative methods were the main source of data collection quantitative methods were also used. The choice to use more qualitative rather than quantitative methods was taken with regard to their suitability for data collection; I do not assert that one or the other is not appropriate for the social sciences. This is because I believe it is the methodological framework that defines the research focus and what the data refers to, rather than the methods and techniques used.

5 DATA COLLECTION

5.1.Three research locations

Data collection was carried out in three different locations

- INPA was the location where group meetings occurred; INPA's zoo-botanical garden was also used by the women in their sales venture and as a meeting point for the group.
- The Vale community where the women live; I visited the women in their community and participated in various community activities.
- I made eight field trips with the women to different locations between January 1997 to June 1998. Location included a forest reserve, Manaus' five star hotel, a community similar to the Vale, the city Opera House, the city park and other towns near Manaus. The main objective of these trips was to provide a focus for the group, but further data was also gathered from the discussions that occurred during them.

5.2 Research techniques

5.2.1 Stage one

The first technique used to collect data about the women's social representations was a questionnaire carried out with one hundred women who lived in the Vale community, in November 1995. The questionnaire offered some interesting data, but was not sufficiently in-depth to disclose the women's social representations.

5.2.2 Stage two

The results from stage one determined the choice of qualitative methods for my thesis plan:

- Semi-structured interviews with each of the eleven women who participated in the study group. I used a piece of paper with key issues to guide each interview.
- Eighteen focus groups with the women were carried out from January 1997 to October 1997 on the INPA campus. Not all of the women attended each meeting; on average there were eight out of eleven present. The focus groups concentrated on the different locations that I visited with the women and any other subjects they suggested.
- Observations I have made from participating in community activities and interacting with groups of women over a four-year period while co-ordinating the programme *Women in Action*, as well as during the focus groups and interviews and on the field trips.

5.3 Data description

All of the interviews and focus groups were taped; only some parts of the field trips were taped due to the length of the trips and outside noise interference. I transcribed the tapes into Portuguese on the same day and later into English. This is the data that I have for analysis.

6 CONCLUSIONS

I have not started to analyse data as yet. I cannot therefore offer results, although I can describe some patterns that I have detected in the women's representations:

- The women have a romantic notion about the natural environment and the rural areas from where the majority of them came. They would not, however, want to return to the rural areas, as the quality of life in terms of food, health, employment, energy and education are not as good there as in the city.
- The women possess a mixture of traditional and modern attitudes that often leads to internal conflict in terms of their personal relationships, child care, family planning, work opportunities, self identities and the ability to demonstrate to others their different beliefs, be they about social, natural or built environmental issues.

7 REFERENCES

de Barros Lima, N. R. L. (1994) Gênero, Desenvolvimento e Meio Ambiente: É possível uma relação transformadora? In: N. R. L. de Barros Lima R. E. Rossini L. Tosi E. M. Marques Vieira and S. M. Garcia *Mulher e Meio Ambiente*. Maceió: EDUFAL. 63-92).

de Castro, R. V. (1995) Representações Sociais da Prostitiuição na Cidade do Rio de Janeiro. In M. J. P. Spink (org.) *O Conhecimento no Cotidiano: as representações sociais na perspectiva da psicologia social*. São Paulo: Brasiliense. 149-187.

Flick, U. (1998) *An Introduction to Qualitative Research*. London: Sage Publications.

Moscovici, S. (1978) *A Representação Social da Psicoanalise*. Rio de Janeiro: Zahar.

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THE MAKING OF A MULTIMEDIA RESOURCE

Lorraine WAUMSLEY

Education Liaison Consultant, Chesham, Buckinghamshire

The CD ROM resource was seen by the BP Amoco Group as a means of educating people to consider the complexities of the topic and enable them to make informed choices regarding lifestyles.
The company in collaboration with 3T Productions set up a small working party of 6; 4 from BP, and 2 from 3T, to do this in November 1997.

The disc has two functions; to educate and to inform. The former will be achieved by making the player the decision maker. The latter through accurate and balanced information from our panel of advisors, the UNFCCC, WWF, the Hadley Climate Centre, and many others.

The tasks for the game are that the player initially is an advisor to a fictitious country's Environment Minister, preparing her for a Kyoto-type conference. If enough of the relevant information is complied then the Minister is well informed and on her return the player is promoted and given the responsibility to manage the reductions agreed to at the conference. Whilst trying to manage this, many problems appear on the screen and virtual colleagues have to be approached for advice and information. All the players decisions have consequences, some immediate and some delayed. There is a 5 year game-time within which emission levels have to be brought down to 1990 levels, within budget and without making the government unpopular with voters. To increase authenticity the player can chose between developed and developing country scenarios.

Key words :

Global
CD Rom Resource
Climate Change
Educate
Inform
Decision Making

THE MAKING OF A GLOBAL MULTI-MEDIA RESOURCE

Lorraine Waumsley

1 INTRODUCTION

1.1 background

Two years ago a brainstorming session was held within BP, as it was then (now it is part of the BP Amoco Group), to decide on the subject of an interactive CD Rom. The company had already produced "Making the Grade", an interactive simulation of the setting up and running of a chemical factory, and could use the program engine to be the basis around which another disc could be formed. The issue of climate change was by far the most popular topic to be considered. The lead on this came from John Browne (Chief Executive of BP) who in an address to the Greenpeace Business 2nd Annual Conference in October 1997 reiterated UK Prime Minister Tony Blair's comment that " no country can opt out of global warming or fence -in its own climate" adding " nor can any company. The Oil industry and its employees are part of society and we have to set a constructive example." (Browne, 1997) The CD Rom resource was seen by BP as a means of educating people to consider the complexities of the issue of climate change and enable them to make informed choices regarding lifestyles. The company in collaboration with 3T Productions set up a small working party of 6, (4 from BP, and 2 from 3T), to do this in November 1997 to progress the project.

1.2

This paper is largely descriptive and much of the evidence is anecdotal gathered by myself and colleagues both within BP and geographers and scientists working in schools. It begins by stating the aims of making the CD Rom and describing the process of putting together such a resource. The problems encountered in trying to achieve a global perspective are looked at, as are the means by which they were overcome. Evaluation of the project was made through our extensive trialling which led to revisions. The conclusion assesses the degree to which the aims have been fulfilled.

2 MAKING THE CD ROM

2.1 aims

The main aims of the CD Rom are to educate and to inform. As Sara Parkin elegantly stated, " information ain't education" (Parkin 1997) The two processes are treated differently on the disc in an attempt to highlight that it is not enough to know facts, rather that actions and the consequences of actions have to be recognised as well. This is something that geographers build in to their teaching on a daily basis. "Education" will be achieved by making the player a decision maker in the fictitious government of Solaria: having to balance the needs, and constraints, of industry, public opinion, and government finance, whilst implementing policies to mitigate carbon dioxide emissions. The player will be "informed" through accurate and balanced comments from our panel of advisors, the UNFCCC, WWF, the UK Met Office, the Climate Unit of the University of East Anglia and many others.

The target audiences are students of fifteen years and above as well as adults both within, and outside of, the company.

Elizabeth Dowdeswell in her foreword comments that " Awareness-raising is essential so that people can make informed decisions about this complex issue." It is this awareness-raising above all that the disc aims to accomplish. (UNEP 1997)

2.2 the game plan

In order to get the messages across in a "fun" way the following game format was devised. Players will first take on the role of Chief Researcher (the research phase) in the Solarian government's Office for the Environment. If they are successful in researching the scientific principles behind and the political implications of, potential mitigation options for climate change, together with Solaria's current greenhouse gas sources/ sinks and current energy usage by type, they will later progress to the role of Chief Policy Advisor. The research will be undertaken in an innovative way, by players responding to issues or requests for advice and information. The three briefing papers that are produced will automatically be added to the data base as the player "meets and telephones" the right people. The more research undertaken, the more that is learnt about climate change, the better the briefing papers will be.

If research is conducted and issues are addressed thoroughly the player is promoted to Head of the new Solaria Climate Change Task Force (the implementation phase) and will be responsible for the implementation of policies selected as a result of their research findings, over a period of five years. This will be achieved with a range of issues designed to cover the many different aspects of climate change. For example, players may be asked to contribute to plans being drawn up by the Office for Transportation, or to investigate the potential benefits available from increased investment in renewable energy sources. During the implementation phase the players' actions are tracked. The 'trackers' button on the computer enables the player to view the impact decisions are having on carbon dioxide emissions, energy production and spend. During the course of the game there will also be feedback about the impacts of the player's decisions on public opinion. At the end of the game the player is provided with a final score which indicates the effectiveness of decisions in terms of money, government popularity and the impact actions have had on carbon dioxide emission reduction.

2.3 education

From the beginning it was decided that as climate change is a global issue we must ensure that we avoid a purely Euro-centric view point. Central to this was getting a group of independent consultants who we could call on for information and advice. We were fortunate in securing the support of the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, and the United Nations Environment Programme (UNEP) Education department. This is also reflected in the choice of actors for the video clips. They were mixed gender and multi-ethnic to avoid stereotyping of roles.

It is also from the UN that we borrowed the concept of "Solaria" the fictitious country. In order to cover as many of the issues that we could it was decided to produce four different versions. Solaria 1 is based on an amalgam of statistical and geographical data from several economically less developed countries from Africa, Solaria 2 on North European countries, Solaria 3 on Asian countries and Solaria 4 on North America. These particular areas were chosen to reflect the range of country types on the scale of highly economically developed to much less economically developed.

The engine of the game is based on a series of flow diagrams that can be programmed into it. Each issue flow diagram begins with a trigger which could be a phone call, e-mail or a meeting, that can be mapped out. An example would be, the Minister of Transport has a problem with major congestion in the capital city centre. He has invited you to a meeting to discuss the possible options.

These options are:

- building a large ring road around the city with wide roads running into the centre

- expanding and improving the existing rail network.
- a massive public campaign to promote more sustainable transport behaviour from the public.

Which one do you push for? What do you insist on if one of the other options is taken up? Having put together a collection of about 120 of these issues, they were then sent out to various experts to map out the actions that could be taken and the consequences of those actions.

From the trigger there are a series of options, such as phoning or meeting with various colleagues to find out what they have to say regarding the issue. So for the above example the Minister for Transport would be visited and also the Finance Minister, external calls can be made to various lobby groups and interested parties such as the Solarian Public Transport Commission. Their responses would list the series of options, one of which must be actioned. As a result various response options get triggered. These might be congratulations for a good choice, a warning from the Finance Minister for overspending, a public protest against your decision or even the sack! Many of the decisions have a built in time lag before the consequences are realised. It may be several years of game time before you find out if your decision was a good or bad one. Sometimes one issue can be a trigger for another issue to give a snowball effect to the decision making process. Through these issues and their attendant decisions it is hoped that the player is being educated about climate change.

2.4 information

The game contains a database that can be accessed at any time. There is also the facility to print. In the research phase of the game three briefing papers are built up as the player makes visits and phone calls. The contents of the Political Options and Possible Response Options Briefing papers are adapted from Technologies, Policies and Measures for Mitigating Climate Change of the Intergovernmental Panel on Climate Change (IPCC 1996) The Science briefing paper was largely written by Mike Hulme of the Climate Unit of the University of East Anglia, and the Political papers by Fareed Yasseen of the UNFCCC.

In the second phase, implementation, all of the documents are automatically loaded into the data base.

Also in the data base is a very comprehensive glossary made up of a merging of six other glossaries taken from various sources. All the main words and terms connected with climate change are listed here. There is also information on scientific principles behind such things as El Nino and respiration. Concepts such as co-generation are explained.

Finally, in response to the fact that access to the Internet had enabled the working group to access research across the world, and the fact that electronic communications are becoming more widespread in their use, we have included on the disc a URL link to the Science across the World site. There is a page on this web site that is devoted to other Internet web pages that have information on climate change issues. For players wishing to do more detailed research this is an excellent jumping off point.

3 EVALUATION

Two members of the working group attended the Conference of the Parties (COP) in Buenos Aires in November 1998. They took with them copies of the trial disc to get as much feedback as possible from the delegates attending. All of the feedback was most encouraging leading us to believe that this resource has a place for raising awareness of the issues of climate change in many parts of the world, despite the language being in English only.

At the same time a mail shot to Heads of Geography in secondary schools in the UK brought forth over 600 responses to trial the disc. There were only 60 discs available which made

choosing the schools very difficult, but literally every type of school and college from every region of the UK was represented.
As a result of feedback from the schools it was realised that the game as a teaching tool was limited because of the time required to complete the game. As a result Solarias 1 and 2 were made considerably shorter. They contain the most important issues only and each version of the game remains the same. This brought down the game time to a total of about 2 hours which would fit much better into the school timetable. Solarias 3 and 4 continue to be the full blown versions, that have a much larger range of issues, a lot of which are generated at random by the computer, so each time the game is played different issues crop up. These versions can be used by individuals, or as extension work for research and so on.

4 DISCUSSION

Sara Parkin delivering The Fourth Burntwood Memorial Lecture states, " In my view, it is the lack of capacity of decision-makers, opinion formers and ordinary citizens to interpret the information around them through even a modest filter of understanding about how the physical world works, that is preventing us from collaborating vigorously in altering the way our human world works, ethically, economically and politically." (Parkin ibid) I agree with this statement having come across so many people, some seemingly highly educated, who have very little basic understanding of the issues raised by climate change. A very unscientific survey that I conducted amongst family, friends and any one I came into contact with, confirmed my suspicions. I would estimate that over 75% of the people I asked, "What is the first thing that comes into your mind when I say global warming?" replied with, "Hole in the ozone layer." One student who was studying geography and sciences at GCSE went on to state that the hole in the ozone layer was letting in too much of the sun's rays and that is why global warming was happening. I cannot imagine that she had ever been taught this so why is there this seemingly widespread ignorance?
My own, unproved, hypothesis is that many newspaper and television reports state hypothetical scenarios as fact, with bold headlines, and it is these snippets that stick in people's memories. They form the framework upon which understanding is built and when the issues are taught in a piecemeal way they are stored away in this ramshackle structure. This leads to the wrong connections, or no connections at all, being made. I do not know of any research that has been done on this to back up what is in essence a strong supposition.
Hopefully, the CD Rom will aid in the battle against such misconceptions. The best use of the disk will be with small groups of students working together to make decisions. The cross-curricula nature of the topic could help to break down subject barriers in the minds of students.

5 CONCLUSION

I believe that the aims of the CD Rom have been fulfilled in that the disc is demonstrably able to inform and educate the player in the complex issues of climate change. In using this resource players will increase their awareness of the balance that is needed between development, energy demand and environmental concerns. They will learn of the disproportionate use of energy between the developed and less developed countries and through this perhaps even their own role in the whole process.

6 REFERENCES

Dowdeswell, E. (1997) Foreword in *Climate Information*.
Geneva UNEP

Parkin, S. (1997) *Education for Sustainability*. Forth Burntwood Memorial Lecture
London: Institution of Environmental Sciences/United Utilities

Watson, R, Zinyowera, M, Moss, R. (Eds) (1996) *Technologies, Policies and Measures for Mitigating Climate Change*.
Geneva IPCC

ATTITUDES OF PORTUGUESE SECONDARY SCHOOL PUPILS IN RELATION TO HAZARDOUS WASTE DISPOSAL AND TREATMENT

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In the last five years there was in Portugal a debate concerning the policy of hazardous waste disposal. In 1998 the Government made the decision about the sites where to dispose and treat industrial waste. Almost immediately people living near those sites protested against that decision. The media gave great importance to those discussions presenting different points of view, both from scientists, local authorities, politicians and the general public.

Our main purpose is to understand in what way this debate was a means to promote environmental education in Portuguese secondary schools.

A questionnaire addressed to pupils intended to check the importance given to this theme in the geography classroom in order to promote students' awareness of environmental problems and solutions.

Results show that in spite of this national debate, only a few teachers introduced changes in their annual planning. This fact points out that teachers are more concerned with the official content of the curriculum than with the possibility of using it as a way to develop problem solving skills, citizenship or simply to link school activities and real life.

PUBLIC UNDERSTANDING OF AIR QUALITY INFORMATION IN THAILAND

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Air quality is a major environmental issue affecting the health of millions of people around the world. Education about air quality, however, is more likely to focus on describing 'pollutants' and their sources than on providing meaningful information about risks posed by air pollution to health. The purpose of this study is to develop a better understanding about how quantitative information about air quality is interpreted and acted upon. Air quality in south-east Asia has been a major social, political and geographical issue. In Thailand, the public were informed about the various pollutants through the media using figures supplied by the Government. We were interested to know to what extent the data would prove to be interpretable by young people. The study is part of a larger comparative study which is supported by the UKs Department for International Development. The first data-gathering exercise involved using a questionnaire to collect information about student knowledge and attitudes and to find out what respondents said that they would do in certain circumstances. The sample was 122 Thai students aged 16-18 in a geographical location directly affected by pollution from forest fires. The data indicate widespread misunderstanding of the implications of different levels of air quality on health. Methodological issues concerning research in this field are discussed in the light of the findings of this study.

Key words:

Air Quality
Pollution
Public Understanding
Thailand
Risk
Knowledge and Behaviour

PUBLIC UNDERSTANDING OF AIR QUALITY INFORMATION IN THAILAND

Justin Dillon, Rod Watson and Rapeepun Suwannatachote

1 INTRODUCTION

Air quality is a major environmental issue which affects the health of millions of people around the world (Ayres, 1998: 1). Raised levels of public concern about air quality are usually linked with particular incidents, such as the smog that affected London in 1952. Air quality in Southeast Asia has been affected in recent years by an annual season of forest fires. The resultant deterioration in air quality is often prolonged, dangerous and obvious to the public. For example, in September 1997, the authorities declared a 'state of emergency' in Sarawak (part of Borneo), because the air quality was so poor (Radojevic, 1998: 38).

The cocktail of chemicals present in urban air in Southeast Asia during recent years is particularly complicated. Forest fires, during the period when flames are seen, release H_2O, CO_2, NO, N_2O and N_2. During the later smouldering phase they release CO, CH_4, CH_3Cl, H_2S, COS, dimethyl sulphide, amines and many others (Radojevic, 1998: 38). Living in an urban area substantially increases the risk to health caused by air pollution (because of emissions from petrol and diesel engines).

Harrison answers the question 'what is a tolerable level of risk' by pointing out that 'there is no universally agreed answer to this question ... society is notably more tolerant of self-imposed risks (e.g. cigarette smoking) than of risks which are perceived as externally imposed such as outdoor air pollution' (1998: 69). According to Harrison, 'long term policy [in the UK] is generally directed at reducing risks to what is termed *de minimus* level, usually taken as a lifetime risk of one in 10^6' (approximately equal to an annual risk of 1 in 10^8). 'Risks are defined as the probabilities of physical harm due to given technological or other processes' (Lash and Wynne, 1992: 4). 'Risk' involves scientific measurement coupled with implicit moral values - what is an acceptable risk in one society might be unacceptable in another. Ulrick Beck, who claims that we are living in a 'Risk Society' (Beck, 1992) argues that 'What is needed to recognise toxic substances in the air, the water and the food, is not so much established values as, rather, expensive measuring instruments and methodological and theoretical knowledge' (1992: 176). As more sensitive and reliable instruments have been developed, and as epidemiologists and environmental scientists have developed better models in their respective areas of study, so the information from air quality monitoring has been used by governments to set standards for air quality.

Quantitative information about air quality has become increasingly available through the media. School curricula references to air quality, however, are more likely to focus on the causes of air pollution than on the implications of different levels of pollutants for public health or about what precautions to take if levels of contaminants are high. Assuming that what is in the curriculum broadly reflects what is taught, then there would appear to be a mismatch between the information available to the public and their education with respect to interpreting the growing body of scientific data published for their benefit.

There are many assumptions made by environmental educators about the value of scientific literacy. One major assumption is that citizens will apply their knowledge of science in everyday situations. This is, to say the least, highly contestable. Public behaviour in terms of food and drug consumption often flies in the face of scientific knowledge. Environmental education, which should take a broader view of environmental issues than science education, and which might encourage a more holistic education than science education alone also suffers

from major assumptions about the efficacy of its methods.
Numerous research studies indicate that the links between an individual's knowledge, attitudes and behaviour are complex and not easily predicted. Telling people that a behaviour has a high risk will not necessarily lead to a person ceasing the behaviour. However, governments do have a responsibility to inform the public about critical environmental situations.
The purpose of the study reported here is to develop a better understanding about how statistical information about air quality is interpreted and might be acted upon. The context of the study, which is part of a wider research project involving an international comparative study, is a small city in Thailand. The research took place during the time when air quality in the area was severely affected by smoke from forest fires in Indonesia (Radojevic, 1998). Previous research into the public knowledge of air quality has generally focused on student knowledge rather than their behaviours, reported or otherwise (see, for example Brody, 1990-91). One of the paradoxes of environmental education is that, for many in the field, environmental education is predominantly about changing what people do whereas the majority of the research in the field looks at what people know.

2 THE STUDY

In Thailand, the public are informed about the levels of various air pollutants by the media using data supplied by the Government. We were interested to know to what extent the data was interpretable by young people who were actively engaged in learning science at the time. The study is part of a larger project, partially supported by the UK Department for International Development, involving the Prince of Songkla University in Hat Yai, Thailand and King's College London, University of London.

2.1 The pilot questionnaire

The first data gathering exercise involved using a pilot questionnaire to collect information about student knowledge, attitudes and reported intentions reasonably quickly. The pilot questionnaire consisted of a small number of 'biographical' questions followed by 14 items of which 9 asked respondents to select a response from a list and then to explain their choice. The other questions had a free response format. Some of the questions were designed to measure knowledge and attitudes whereas others were intended to explore what respondents said that they would do in certain circumstances.

2.2 Sample

One school in Hat Yai was selected because of its location: the school is in an area where the smoke from forest fires would be the major source of air pollution rather than vehicles. Questionnaires were given to 122 Thai school students (82 female and 40 male). The students were all in Grade 11 and were aged 16 (n=10), 17 (n=88) and 18 (n=24).

3 RESULTS

Frequency counts were carried out for the responses to all the multiple-choice questions and data from these are reported as percentages in the tables below. Responses to the open-ended questions were grouped together by meaning.

3.1 Intention to act

Respondents were told that the 'safe' limit for airborne smoke particles in Thailand is below

100 ppm. They were told that the air quality for three successive days was 90, 102 and 150 ppm. They were asked to select from a list of possible actions for each day (Table 1).

TABLE 1 PERCENTAGE OF STUDENTS CHOOSING PARTICULAR ACTIONS FOR THREE AIR QUALITY LEVELS)

Action	90 ppm	102 ppm	150 ppm
Go outdoors as normal	41	11	7
Go outdoors as normal but wear a mask	16	27	16
Avoid going outdoors	40	56	52
Stay inside all the time	1	3	14
Move to a place where the air is cleaner	0	2	11
Don't know	1	2	1

It appears that the safety level is perceived as a critical concentration by the respondents. Even when the level of pollution is below the recommended level, 41% of the participants would stay inside or avoid going outside. When the concentration is above the recommended limit, the percentage of participants prepared to go outside drops from 41% to 11%. However, there are differences in participants prepared to go outside when the level increases to 150 ppm indicating that a significant number of participants see 150 ppm as significantly more dangerous than 102 ppm. The respondents who said that they would go outside as normal explained themselves either by saying that the level was safe or by saying that they had a duty to go outside.

3.2 Knowledge about the effects of different levels of air quality

Respondents were asked to explain 'what would happen to you if you went outside, without a mask for a long time?' when the level of air quality was 150 ppm and when the level was 90 ppm. For a level of 150 ppm, 28% of respondents mentioned irritation to the nose and eyes and/or bronchitis; 45% mentioned breathing problems including coughing; 17% mentioned headaches and 10% mentioned other health effects. For 90 ppm: 48% of respondents said that the air quality was safe; 32% mentioned irritation to the nose and eyes and/or bronchitis; 12% mentioned headaches and 2% mentioned other health effects.

3.3 Opinion about the risks to health of different levels of air quality

Another method of finding out respondents' opinion about the risks posed by different levels of a pollutant involves asking what advice the authorities should give for different levels of air quality. The responses are shown in table 2.

TABLE 2 PERCENTAGE OF STUDENTS RECOMMENDING ACTION BY THE GOVERNMENT FOR THREE AIR QUALITY LEVELS

Government advice	150 ppm	174 ppm	320 ppm
Advise everyone to act normally	20	2	2
Advise old people to stay indoors	11	16	3
Advise everyone to wear a mask if they go outside	68	69	39
Advise everyone to stay indoors	0	14	56

3.4 Knowledge of environmental issues

Respondents were asked to explain 'global warming'. 56% mentioned 'higher temperatures'; 16% mentioned that the atmosphere will be damaged; 14% mentioned the Greenhouse effect and 14% mentioned CO and CO_2 damaging the ozone layer.

Respondents were then asked to explain what they though caused 'global warming'. 32% mentioned deforestation and/or a natural resource being damaged; 32% mentioned air pollution and/or CO/CO_2 and/or smoke from cars; 20% said that it was due to selfish human behaviour and 12% mentioned atmospheric damage.

Knowledge about unleaded petrol appeared to be poor - only 19% of respondents said that it did cause pollution (Table 3 shows the responses).

TABLE 3 KNOWLEDGE ABOUT POLLUTION CAUSED BY UNLEADED PETROL

Opinion about unleaded petrol	%
It does not cause pollution	30
I am not sure	52
It does cause pollution	19

3.5 Attitude towards the scientists' pronouncements

Confidence in the official Government scientific opinion appears to be high among the respondents. When told that 'Government scientists say that the average temperature of the atmosphere will rise by 2°C by 2005', 77% of respondents were either 'very sure' or 'fairly sure' that this would happen (Table 4 shows all the responses).

TABLE 4 CONFIDENCE IN GOVERNMENT SCIENTIFIC OPINION

Confidence in Government scientists' prediction	%
I am very sure this will happen	25
I am fairly sure this will happen	52
I am uncertain whether this will happen	20
I do not think this will happen	2

3.6 Opinion about action the Government should take

Opinion about what the Thai Government should do faced with knowledge that 'Some Governments have taken action to reduce the amount of carbon dioxide released into the atmosphere because they think it causes global warming' was clear - 96% of respondents were of the opinion that the Government should 'Stop levels of carbon dioxide rising further' or 'Reduce the amount of carbon dioxide released' (Table 5 shows the responses).

TABLE 5 OPINION ABOUT GOVERNMENT ACTION ON CO_2 EMISSIONS

Action Government should take	%
Take no action at all	2
Take no action until more evidence is available	2
Stop levels of carbon dioxide rising any further	46
Reduce the amount of carbon dioxide released	50

4 CONCLUSIONS

Previous research into student knowledge about environmental issues has usually reported varying amounts of confusion and ignorance (e.g., Wals, 1994; Boyes and Stanisstreet, 1996). Researchers have usually provided recommendations about what to teach (Boyes and Stanisstreet, 1996: 194) or on how to teach (Wals, 1994: 209-216). Some researchers have looked at trying to explain why it is that people think in particular ways (Wylie, Sheehy, McGuinness and Orchard, 1998). However, one question that is rarely addressed is 'How might public knowledge of environmental issues affect public health?'.

Implicit in the growth of public information is a belief that the public will be able to interpret the data provided and take appropriate action. The evidence would appear to be that the publication of raw data is unlikely to lead to significantly increased public understanding of the health risks associated with issues such as air quality. Firstly, because the underlying weakness in knowledge of air quality and its links with health and, secondly, because the inability of significant numbers of the public to make sense of the data in a raw form. One possible solution to the latter problem might be to publish the data as a risk factor - in the same way that weather forecasters sometimes talk about a 90% probability of rain.

The evidence appears to be that the public, as represented by this sample at least, trusts the scientists' pronouncements on environmental issues. Would this not be the situation, the implications for public health would be even more daunting.

We would like to turn now to discuss some methodological issues that we see as being important. Research into the links between intention to act and action would support our provisional analysis of the data so long as we bear in mind that the link is stronger for specific actions as opposed to general actions. Nevertheless, we feel that in the next round of data collection there should be more questions about what respondents did on days when the air quality was particularly poor. The level of pollution is clearly only one factor in the decision making process and more research is needed to find out what contribution the scientific information makes to forming an individual's intention to act.

REFERENCES

Ayres, J. G. (1998) Health effects of gaseous air pollutants. In R. E. Hester and R. M. Harrison (Eds.) *Air Pollution and Health*. Cambridge, UK: Royal Society of Chemistry, pp. 1-20.

Beck, U. (1992) *Risk Society. Towards a New Modernity*. London: Sage.

Boyes, E. and Stanisstreet, M. (1996) Threats to the Global Atmospheric Environment: The extent of pupil understanding. *International Research in Geographical and Environmental Education*, 5(3): 186-195.

Brody, M. J. (1990-91) Understanding of pollution among 4th, 8th, and 11th grade students. *Journal of Environmental Education*, 22(2): 24-33.

Harrison, R. M. (1998) Setting health-based air quality standards. In R. E. Hester and R M Harrison (Eds.) *Air Pollution and Health*, Cambridge, UK: Royal Society of Chemistry, pp. 57-73.

Lash, S. and Wynne, B. (1992) Introduction. In U. Beck, *Risk Society*, London: Sage, pp. 1-8

Radojevic, M. (1998) Burning issues, *Chemistry in Britain*, December, pp. 38-42.

Wals, A. E. J. (1994) *Pollution Stinks! Young adolescents' perceptions of nature and environmental issues with implications for education in urban settings*. De Lier, Netherlands: Academisch Boeken Centrum.

THE CASE FOR VALUES AWARENESS IN ENVIRONMENTAL HIGHER EDUCATION

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This paper examines the 'values' in environmental higher education (EHE), particularly in relation to the teaching and learning of geography and environmental studies/science. We argue that EHE is laden with values - frequently unacknowledged - which reside in the 'messages' students actively construct from sources such as: tutors, books and articles, curricula, institutions, 'knowledge communities', and society more generally. Moreover, these values - which may be cultural, ecological, economic, philosophical and political - are an *inherent* feature of environmental knowledge - including environmental *scientific* knowledge - and of EHE as a whole. Consequently, we maintain that they should - as far as possible - be made explicit, and that students should learn to recognise and think critically about them. We suggest that an appreciation of work undertaken in the philosophy and sociology of knowledge / science, and in environmental philosophy / ethics, would enable students to engage in this kind of critical thinking; but recognise that if students are to deploy these perspectives *systematically* in *all* areas of their education, new teaching and learning strategies are required.

Keywords

Critical thinking
Environmental higher education
Epistemology
Science
Values

THE CASE FOR VALUES AWARENESS IN ENVIRONMENTAL HIGHER EDUCATION

J. Quentin Merritt, Peter C. Jones and Clare Palmer

1 INTRODUCTION

This paper examines the question of 'values' in environmental higher education (EHE), particularly in relation to the teaching and learning of geography, environmental studies and environmental science.[1] We argue that EHE is *pervasively* and *inescapably* value-laden: with values that are unacknowledged and frequently concealed from students and teachers alike, as well as those which are acknowledged and made explicit in the learning process. *Contra* those who believe EHE can and should be value-neutral, we maintain that values must be accommodated in EHE: they should - as far as possible - be made explicit, and students should learn to recognise and think critically about them.

2 VALUES AND THE ENVIRONMENT

The nature of 'value', and the basis upon which something might be said to be 'valuable', are questions which have been - and are still - debated a great deal in disciplines across the humanities and social sciences - and, most notably, in philosophy (eg Hare, 1952; Mackie, 1977). We shall not go into these debates in any detail here, but we do propose to outline how we shall be using the word 'value' - and its cognate terms.

First, statements about value are - by definition - statements that express a judgement of the worth, usefulness or quantity of a thing (eg action, attribute, person, object, practice, process, outcome, state of affairs). In this paper, we are concerned with the first two of these categories: judgements of worth - which may be aesthetic, ethical and/or preference-based - and judgements of usefulness. We are not concerned with the third category, where value is used to refer to the measure of some variable (eg intensity, length, mass, speed, strength, time period). Keywords used to express judgements of worth and usefulness include: *attractive*, *desirable*, *good/bad*, *important*, *right/wrong*, and *significant*. Such judgements are also implicit in statements containing prescriptive terms such as: *must*, *have to*, *ought to*, and *should*.

So far, we have restricted our comments to statements that express value judgements. However, value judgements may also be said to reside in actions and decisions. (Lowrance, 1985: 12-14) These judgements may be explicitly revealed in statements offered in support of such actions and

[1] The paper principally derives from our own experience of teaching in EHE; and from work undertaken as part of a three-year project, *Teaching and Learning at the Environment-Science-Society Interface* (TALESSI), funded by the Higher Education Funding Council for England and Wales (HEFCE). The aims of the project are to develop and disseminate teaching and learning resources that promote interdisciplinarity, values awareness and critical thinking in EHE. This work is underpinned by documentary research and extensive dialogue with colleagues in EHE. Information about the project, including draft teaching and learning resources, can be found at the project web-site: http://www.gre.ac.uk/~bj61/talessi

decisions, or they may be implicit in the actions and decisions themselves. We can say, then, that statements - and, therefore, texts more generally - together with actions and decisions may - explicitly or implicitly - express value judgements. In other words, they may be *value-laden* or imply *value commitments*.

As with value in general, questions of value in environmental contexts are also much debated - and hotly contested. We shall restrict ourselves, therefore, to a brief commentary on the different approaches that might be taken. One of the key distinctions in the field of environmental values is between *instrumental* and *intrinsic* understandings of value. Instrumentalists believe that the environment is valuable only insofar as it is useful to humans. This usefulness may take many different forms (eg aesthetic, cultural, economic, educational, material, recreational, scientific, spiritual); and, indeed, there is much debate as to the relative importance of these different 'uses' of the environment. (Passmore, 1974) Others take a different view, maintaining that whilst the environment does have instrumental value for humans, it also has value in itself - over and above, or independent of, any instrumental value it might have for humans. However, there is much disagreement as to what kinds of entity have intrinsic value. For example, some restrict their sphere of consideration to primates, whilst others include all mammals, or all vertebrates, or all animals, or all living things. Others focus their concern on collectives such as species and ecosystems, rather than on individual organisms. (Attfield, 1987; Callicott, 1984; Rolston, 1989; Taylor, 1986. For a detailed discussion of the different ways in which the term 'intrinsic value' is used, see O'Neill, 1993: 8-25.)

There are, then, a multitude of ways in which questions of environmental value can be approached. Furthermore, there are myriad views on the importance attached to different kinds of environmental value in relation to other - and often competing - non-environmental values (eg cultural, economic, political, social). In the next section, we examine ways in which these values - environmental and non-environmental - pervade Environmental Higher Education.

3 VALUES IN ENVIRONMENTAL HIGHER EDUCATION

Students working in EHE encounter values in a variety of ways. Amongst the principal sources of value judgement which students encounter are those emanating directly from individual tutors, both during and outside formal teaching sessions. However much tutors might seek to set aside their personal values, it is inevitable that some of these are conveyed to students - overtly or covertly - through verbal and non-verbal communications. Explicitly value-laden messages might concern, for example, tutors' judgements on the views of environmental opinion-formers or the actions of decision-makers (eg the mass media, pressure groups, government, business). Implicit expressions of value commitment might reside in communications as diverse as tutors' evaluations of proposed research topics, their provision of 'careers' advice, and even (though by no means least important) evidence of their own lifestyles.

Students are also exposed to more or less hidden value judgements via the documentary sources they consult, including those recommended by tutors. Books, articles and reports abound with endorsements of particular value-laden choices, in individual behaviour and - especially - in environmental management and policy making. Whilst some acknowledge and defend their

value-basis, many fail to do so; and it is frequently the case that value-laden conclusions are presented as deriving unproblematically and incontestably from empirical evidence - an error of reasoning referred to by philosophers as the 'naturalistic fallacy'. (Graham, 1981: 1)

Values - hidden and revealed - are more systematically embedded within students' learning via the formal curriculum, and unavoidably so. For example courses, or components thereof, may exhibit some kind of ecocentric orientation - with an emphasis on the intrinsic worth of nature conservation; or an anthropocentric orientation - perhaps focusing on pollution control, waste management and/or rural recreation management. In more and less subtle ways, EHE curricula may bear the imprint of their immediate institutional context (eg a given profile of staff expertise, or a particular institutional mission); of government policy (eg the UK's former *Enterprise in Higher Education* scheme, and the more recent Dearing Report's advocacy of 'lifelong learning' for employability: see National Committee of Inquiry into Higher Education, 1997); of other HE sponsors and stakeholders (especially business, professional bodies, learned societies and research councils); and of student demand, for some kinds of course in preference to others.

This latter point should remind us that students themselves are active agents in the construction of values within EHE - and not simply passive consumers of values emanating from within EHE and beyond (eg the mass media). First, students come to EHE with their own sets of personal values, including environmental values - albeit that they may be somewhat inchoate. And second, it seems probable (and consistent with our own experience) that EHE students *tend* to cohere as a 'cultural community' - and, in so doing, tend to reinforce one another's environmental and other values. This proposition is consistent with Rosemary Stevenson's (1992) argument that, for cultural groupings *in general*, existing views - once established - will tend to be reinforced by the partially pre-selected experiences of group members; that is, by what they see, hear, read and so on. They tend, she claims, to adopt a less critical approach to evidence and arguments that are consistent with their existing beliefs, and a more critical one to those that contradict them.

Amongst the least recognised *and* deeply-seated of influences - on HE teachers, students, source materials and curricula alike - is that of the *knowledge or 'epistemic' communities* with which EHE is associated, either directly or indirectly. We are referring to those bodies of - mainly taken-for-granted - knowledge which are characteristically shared amongst members of an academic discipline or profession. (For a overview of 'disciplinary cultures' - including social, as well as intellectual, differences - see Becher and Huber eds, 1990.) This includes assumptions concerning the nature of 'reality', and ways in which knowledge can be produced and validated; bodies of theoretical knowledge; assumptions as to what are the most important objects for scholarly attention; and, indeed, beliefs concerning the learning processes by which students can most effectively graduate to full membership of such a community. The degree to which such assumptions are recognised seems to vary between disciplinary communities. It is not uncommon, for instance, for social science and humanities disciplines to attempt, at least, to acknowledge and critique their underlying assumptions - and to tolerate and debate difference - both in their research and their teaching. This may provide some opportunities for students to identify and explore the value commitments embedded within their education. Such critical awareness is less often displayed in natural and physical science communities where, whilst experimental results and interpretations may often be contested, the nature of scientific

knowledge and its methods is less widely discussed. Indeed, Kuhn goes so far as to maintain that "scientific education remains a relatively dogmatic initiation into a pre-established ... tradition that the student is neither invited nor equipped to evaluate." (1963: 84-5) And yet, as Kuhn and many more recent authors in the sociology and philosophy of science have argued, natural scientific knowledge is characterised by provisionality, uncertainty, selectivity and contestability. From this perspective, all knowledge - *including scientific knowledge* - is, to a greater or lesser extent, 'socially constructed'. (Chalmers, 1988; Longino, 1990; Lowrance, 1985; Mulkay, 1991. For a concise and critical introduction to the 'social study of science', see Woolgar, 1988.) And, indeed, this is probably nowhere more apparent than in the science of environmental questions. (Braun and Castree, 1998; Hannigan, 1995; O'Neill, 1993; Shrader-Frechette and McCoy, 1994; Stevenson, L, 1993; Wynne, 1992; and Yearley, 1996)

Environmental Higher Education is clearly characterised by *epistemic plurality*: the perspectives of the social sciences and humanities (including epistemologically-divergent variations thereof) frequently co-exist - albeit in varying proportions from course to course - with those of the natural sciences. However, for the UK at least, recent evidence suggests that *integration* of these diverse perspectives remains a comparative rarity (see HEFCE, 1995a and 1995b). Rather, courses are commonly delivered as unconnected pockets of knowledge, premised on largely *incommensurable* and *hidden* epistemologies - thereby abdicating to students the improbably daunting responsibility for recovering and evaluating the most deep-seated assumptions, upon which rest the knowledge claims advanced from within those perspectives. Without doubt, there are exceptions: for example, geography courses which include a 'history and philosophy of geography' component; and (less commonly) environmental studies or science courses which incorporate some philosophy and sociology of science. However, their potential for 'critical epistemological evaluation' is unlikely to be realised in circumstances where such elements are perceived as the somewhat arcane interest of an intellectual minority, operating within a wider academic environment where epistemological 'hegemony' is enjoyed by the purportedly value-free perspective of the natural sciences - along with their positivist counterparts in the social sciences. In our experience, 'hegemony' of this kind is probably strongest in environmental science, and weakest in geography.

5 CONCLUSIONS

We are unable, in this short paper, to systematically explore the implications of this analysis for Environmental Higher Education. Rather, a few broad generalisations must suffice. Most importantly, we believe that what we call 'values-awareness' should be an aim of all EHE programmes; that is students should be made aware of, and enabled think critically about, the values that are embedded within the totality of their educational experience. This commitment to values awareness derives from an acceptance of the widely espoused view that *critical thinking* should be a core aim of all undergraduate studies. If EHE is value-laden, then values awareness is clearly a pre-requisite for critical thinking more generally.

This, of course, raises the question of how values awareness might be taught. Amongst other things, it seems to us, students need to develop an approach to learning based on a 'problematised' view of knowledge; that is, a view of knowledge production as a process of

claims making - drawing on perspectives deriving from the philosophy and sociology of knowledge / science. This would provide them with some general conceptual tools for thinking critically about the socially constructed and value-laden nature of knowledge. In addition, an appreciation of work undertaken in environmental philosophy / ethics would assist them in recognising the specifically *environmental* values that pervade EHE. However, there would be little point, for our purposes, in teaching such perspectives if all students gained was yet another body of compartmentalised knowledge to be regurgitated in essays and exams. What is needed are teaching and learning strategies that require students to deploy these perspectives *systematically* in *all* areas of their education. This represents a formidable challenge for EHE, but we hope that our TALESSI project will make a modest contribution towards meeting it.

6 REFERENCES

Attfield, R (1987) *A Theory of Value and Obligation*. Beckenham: Croom Helm.

Becher, T and Huber, L (eds) (1990) 'Disciplinary Cultures'. Special issue. *European Journal of Education*, 25(3).

Braun, B and Castree, N (1998) *Remaking Reality. Nature at the Millennium*. London: Routledge.

Callicott, JB (1984) Non-anthropocentric Value Theory and Environmental Ethics. *American Philosophical Quarterly*, 21(4): 299-308.

Chalmers, A (1988) *What is this Thing called Science?* Second edition. Milton Keynes: Open University Press.

Graham, L (1981) *Between Science and Values*. New York: Columbia University Press.

Hannigan, JA (1995) *Environmental Sociology. A Social Constructionist Perspective*. London: Routledge.

Higher Education Funding Council for England and Wales (1995a) *Quality Assessments of Environmental Studies*. Bristol: HEFCE.

Higher Education Funding Council for England and Wales (1995b) *Quality Assessments of Geography*. Bristol: HEFCE.

Hare, RM (1952) *The Language of Morals*. Oxford: Oxford University Press.

Kuhn, TS (1963) Scientific paradigms. In B Barnes (ed) *The Sociology of Science*. London: Penguin.

Longino, HE (1990) *Science as Social Knowledge. Values and Objectivity in Scientific Inquiry*. Princeton: Princeton University Press.

Lowrance, WW (1985) *Modern Science and Human Values*. Oxford, Oxford University Press.

Mackie, JL (1977) *Ethics: Inventing Right and Wrong*. London: Penguin.

Mulkay, M (1991) *Sociology of Science. A Sociological Pilgrimage*. Milton Keynes: Open University Press.

National Committee of Inquiry into Higher Education (1997) *Higher Education in the Learning Society*. London: HMSO.

O'Neill, J (1993) *Ecology, Policy and Politics*. London: Routledge.

Passmore, J (1974) *Man's Responsibility for Nature*. New York: Charles Schribner and Sons.

Rolston, H (1989) *Philosophy Gone Wild*. New York: Prometheus Books.

Shrader-Frechette, KS and McCoy, ED (1994) How the Tail Wags the Dog: How Value Judgements Determine Ecological Science. *Environmental Values*, 3: 107-20.

Stevenson, R (1992) Thinking, Believing and Persuading: Some Issues for Environmental Activists. In DE Cooper and JA Palmer (eds) *The Environment in Question: Ethics and Global Issues*. London: Routledge.

Stevenson, L (1993) Is Scientific Research Value-Neutral? In S Armstrong and R Botzler (eds) *Environmental Ethics: Divergence and Convergence*. London: McGraw-Hill.

Taylor, P (1986) *Respect for Nature*. Princeton: Princeton University Press.

Woolgar, S (1988) *Science. The Very Idea*. Chichester: Ellis Horwood and London: Tavistock Publications.

Wynne, B (1992) Uncertainty and Environmental Learning: Reconceiving Science in the Preventative Paradigm. *Global Environmental Change*, 2: 111-127.

Yearley, S (1996) *Sociology, Environmentalism, Globalization*. London: Sage.

ENVIRONMENTAL EDUCATION IN RUSSIAN UNIVERSITIES

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The new system of training specialists in ecology aimed at the solution of acute environmental and nature management problems started in Russian universities five years ago. Nowadays, this kind of training is fulfilled in 52 Russian universities. Ecological education is organised according to a multi-level scheme with different duration of training bachelors, specialists and masters of sciences students. Depending on their likely future work students are trained in several directions: 1. Nature management to solve problems of rational nature resources management (educational programs pay great attention to studies on geographical peculiarities of territorial organisation, development of nature resource potential of a territory, assessments of economic damage due to pollution and mismanagement of natural systems); 2. Geoecology - to study the interaction of natural spheres (atmosphere, hydrosphere, biosphere, lithosphere, landscape sphere) and consequences of impacts of human activity; 3. General and applied ecology - to study functioning of ecosystems under economic stresses and organisation of their sustainable development, etc. So, the inter-disciplinary approach to education is the main principle of creation of educational programs and plans. This approach is based on the fundamental disciplines of different sciences related to problems of ecology and nature management, such as geography, biology, chemistry, economy, social sciences, legislation, geology, physics, etc. The key place is occupied by geography.

As it is well known, geographical science deals with earth spheres and their interactions. But, besides, it studies social and economic issues of population and economy, their mutual dependence and influence on natural components. Thus, geography creates the basis for investigations and solution of numerous ecological problems appearing due to social pressures on the environment. In this respect the existing fundamentals and variants of geographical education back the training of specialists in ecology. The analysis of university educational plans and programs for training in the field of ecology and nature management shows that the complex of geographical disciplines occupies from 40 to 65% in lecture and seminar studies.

The vast territory of Russia creates the wide range of regional ecological problems, requiring rather narrow specialists to solve them. To satisfy these requirements the specialised regional variants of educational programs were elaborated to satisfy local requirements in specialists of the necessary orientation. The examples are given for some universities (universities of Perm, Saratov, Kaliningrad, Voronezh) to illustrate the variants of regional educational programs.

ENVIRONMENTAL EDUCATION IN RUSSIAN UNIVERSITIES

Nikolay S. Kasimov, Emma P. Romanova

The Declaration and the Program of Sustainable Development, adopted in 1992 by the UN Conference on the Environment defined the first and foremost measures for environmental education of world population. The unquestionable topicality of these documents is based on the apprehension of acuteness of environmental situations in different countries, including Russia.

Adoption of the documents was not unexpected for Russian system of higher education. The deep concern of scientific society about ecological problems and critical situations in different regions and towns of Russia is expressed in numerous scientific and popular publications of geographers, biologists, geologists, etc., in conclusions and recommendations of All-Union and All-Russian scientific congresses, conferences, and symposia. But, there was no common opinion on the content of training of specialists aimed to solve diverse and complex problems of interrelations between men, society, and nature.

Despite the obvious need of the national economy in professionally trained specialists in the field of environmental sciences, geoecology and rational nature management, four years ago only one specialty, called "Protection of the Environment and Rational Nature Resources Management", existed within the system of higher education. The corresponding specialists were trained mainly in chemical-technological higher schools, and at geographical faculties of universities. Naturally, the demands of the economy, science and education could not be satisfied in this way for specialists in the most broad sphere of professional activity: the system "man-society-nature".

The new system of training specialists in ecology aimed at solution of acute environmental and nature management problems was commenced in Russian universities during recent five years. Nowadays, this kind of training is fulfilled in 52 Russian universities. Ecological education is organized according to multi- level scheme with different duration of training; there are the training variants for bachelors (4 years duration), specialists (5 years duration) and masters of environmental sciences (6 year).

The main task of future specialists in this field is to study the systems of interaction of nature and society, i.e. qualitative state of the environment, experiencing active and increasing pressure from economy structures, responses of the nature to this impact and determination of ecological risks due to negative nature-anthropogenic processes. So, future ecologists and specialists in the field of nature management have to be able to solve following tasks:

- to conduct complex studies (for economy branches; at regional, national and global levels) of environmental problems, to elaborate recommendations;
- to design typical nature-protective measures;
- to estimate the impacts on the environment;
- to design and implement geoecological monitoring;
- to design and use social and legislative mechanisms of forming and realization of state ecological policy, etc.

The broad spectrum of tasks posed before the future ecologist, defines specific methodological approaches to organization of education. The complex character of environmental sciences, dealing with nature, society, and economy, determines its connections with geography, biology, economy, chemistry, sociology, and other fundamental scientific and educational directions (Fig. 1).

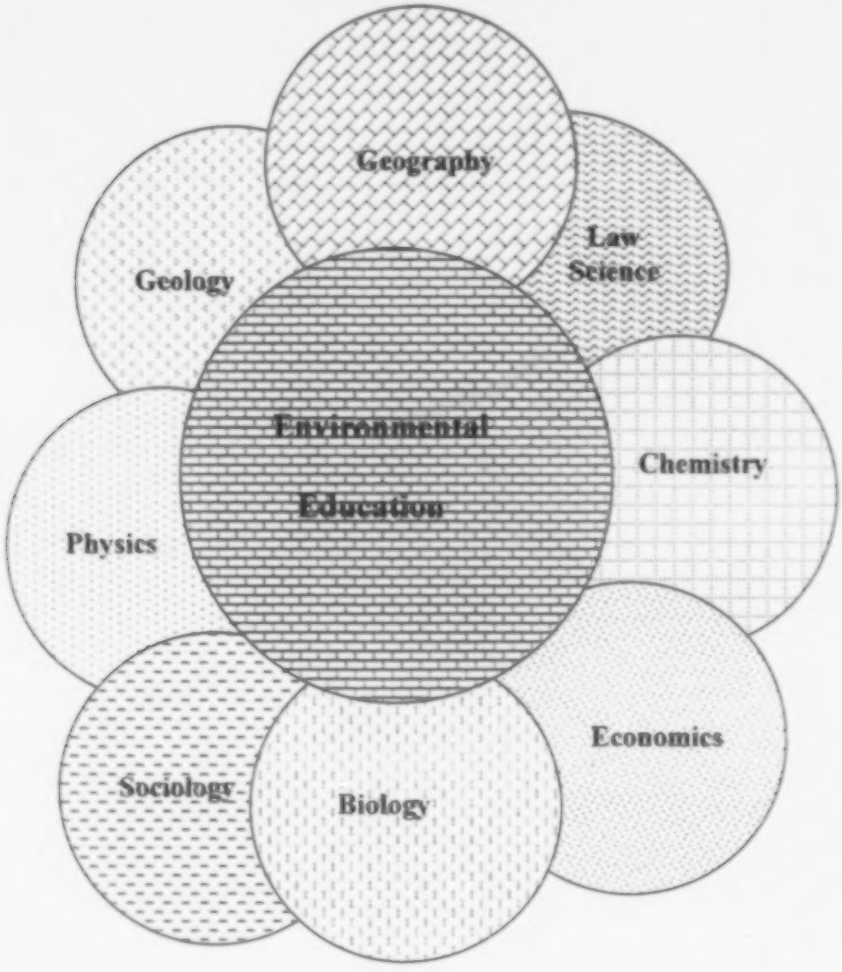

Figure 1. Fields of knowledge
taking part in Environmental Education

So, the inter-disciplinary approach to education is the main principle of creation of educational programs and plans. This approach is based on fundamental disciplines of different sciences related to problems of ecology and nature management, such as geography, biology, chemistry, economy, social sciences, legislation, geology, physics, etc (Fig. 2).

The key place is occupied by geography. As it is well known, the geographical science deals with earth spheres and their interactions. But, besides, it studies social and economic issues of population and economy, their mutual dependence and influence on natural components. Thus, the geography creates the basis for investigations and

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solution of numerous ecological problems appearing due to social press on the environment. In this respect the existing fundamentals and variants of geographical education back the training of specialists in ecology. The analysis of university educational plans and programs for training in the field of ecology and nature management shows that the complex of geographical disciplines occupies from 40 to 65% in lecture and seminar studies.

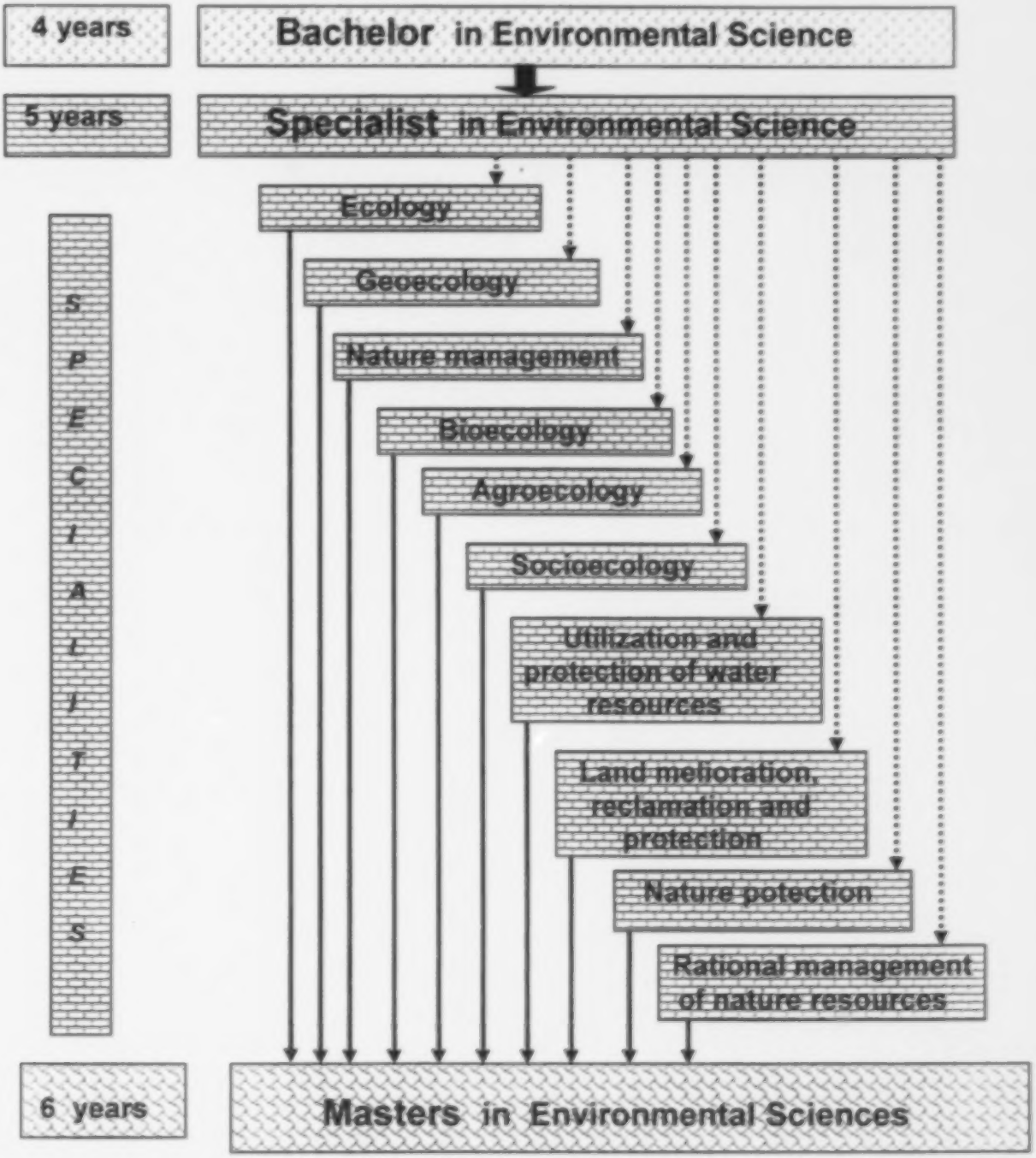

Figure 2. Structure of Environmental Education

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Depending on the supposed future work students are trained in several directions:

1. *Nature management* – to solve problems of rational nature resources management (educational programs pay great attention to studies on geographical peculiarities of territorial organization, development of nature resource potential of a territory, assessments of economic damage due to pollution and mismanagement of natural systems);
2. *Geoecology* – to study the interaction of natural spheres (atmosphere, hydrosphere, biosphere, lithosphere, landscape sphere) and consequences of impacts of human activity;
3. *General ecology* – to study functioning of ecosystems under economy stresses and organization of their sustainable development, etc.

The five-year period of education of the specialist-geoecologist has approximately 8,200 hours of training, distributed as following:

- Auditory hours – lectures, practice, seminars, laboratory investigations, etc. – about 4,000 hours. This value comprises basic educational disciplines.
- Independent work of a student in libraries, laboratories, departments, etc. – approximately 1000 hours.
- Practical work in expeditions or at specialized educational sites, in scientific, educational, industrial and designing organizations. Usually from 2 to 3 months are devoted to this kind of work, mainly during summer period.
- Scientific research of a student expressed in yearly reports, and in presentation of a paper for Specialist or Master of Science degree. Twelve weeks are devoted to these research works during each of the last two years of education.

The vast territory of Russia creates the wide range of regional ecological problems, requiring rather narrow specialists to solve them. To satisfy these requirements the specialized regional variants of educational programs were elaborated to satisfy local requirements in specialists of the necessary orientation. The examples are given for some universities (universities of Voronezh, Perm, Kaliningrad) to illustrate the variants of regional educational programs.

Voronezh University is one of the oldest and largest region universities. It is located in the Central Russia with intensive agricultural orientation. The curriculum of the Ecological specialties (Nature Management) of this university includes the following disciplines: *Social and Economic Geography of the region, its Physical Geography, Agrolandscape studies, Anthropogenic landscape studies, and some others* covering up to 1000 hours of studies.

Perm University is located in the oblast center of the Ural economical region with very intensive mining branch of economy, metallurgy, and machinery. There are very acute environmental problems in this region. Thus the region needs in specialists able to solve problems of the environment protection and rational nature management. During recent years the specialists in this field are prepared. The curricula of the geographical faculty of the Perm university include alongside with the physical and economic geography of the region the courses on the *Environment protection, Geoecological monitoring and expertise, Geoecological studies*. In the faculty the Educational center of qualification

update of specialists dealing with environmental protection problems and rational nature management is organized.

Kaliningrad university is located in the sea port city at the Baltic seashore, which influence the training of geographers. The geographical faculty provides the training in the field of *Physical and Economical Geography of the Ocean, Development of fishery and other rescues sea resources;* the oceanologic investigations are carried out as well. These issues occupy more than 40% of the block of special disciplines.

Thus, curricula of the regional universities follow closely their regional specificity. In the end, taking into account the deficit in teachers for the secondary and the high schools all the universities train teachers for these schools.

In the long run the creation of branched system of continuous environmental education – from pre-school to higher – is the only condition which allows to solve numerous very complicated problems of environment protection and rational nature management. The perception of ecological danger for a separate region or for a country as whole, the ability to improve crisis situations, depend to a large degree on environmental educational level of decision-makers, and availability of highly qualified specialists implementing the decisions.

The introduction of the modern system of ecological training into Russian universities requires to widen the international co-operation in the field, to organise special scientific and methodological symposia and conferences for experience exchange with different universities of the world.

REFERENCES

Kasimov N.S., Romanova E.P., Alexeevski N.I. (1995) Higher Geographical and Ecological Education in Russia. : *Becoming Professional*, Papers of IGU Regional Conference, Prague, August 22-26, 1994, Brisbane (Australia), pp.41-49.

Kasimov N.S. (1992) Ecological Education, in: "Vestnik Vysshei Shkoly" (The Herald of Higher School), No. 10-12, pp. 61-63 (In Russian).

COMMON THEMES ACROSS A VARIED GEOGRAPHY: A FIRST LOOK AT THEORY AND PRACTICES OF BIODIVERSITY EDUCATION IN CANADA

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The Convention of Biological Diversity is the most comprehensive international treaty dealing with life on earth. Ratified by more than 170 countries, it contains a far-reaching agenda for economic, environmental and social changes across the globe. Biodiversity education is recognised within the Convention as playing a key role in engaging civil society in policy planning and the implementation and evaluation of Biodiversity strategies.

This paper is based on a report commissioned by the Canadian Government to inform the education negotiations at the fourth meeting of the Conference of the Parties to the Convention on Biological Diversity in May 1998. The first section of the paper investigates trends and influences from contemporary educational theory and their influence on the ways in which biodiversity education is understood and defined. The second section highlights examples of biodiversity education as identified by practitioners across Canada.

Key words :

Biodiversity
Environment
Policy
Education
Canada
Sustainability

COMMON THEMES ACROSS A VARIED GEOGRAPHY: A FIRST LOOK AT THEORY AND PRACTICES OF BIODIVERSITY EDUCATION IN CANADA

Elin Kelsey

1 INTRODUCTION

The Convention on Biological Diversity (CBD) is the most comprehensive international treaty dealing with life on earth. Ratified by more than 170 countries, it contains a far-reaching agenda for economic, environmental and social changes across the globe. The Convention recognizes the important roles that education, awareness and training play in building the sustainable societies upon which biodiversity goals depend. Yet, too often, biodiversity education is erroneously equated with information dissemination and included only at the tail end of policy implementation.

This paper provides an overview of trends and influences from contemporary educational theory, and the implications of various conceptual frameworks on the ways in which biodiversity education is understood and practiced. It draws upon examples from a cross-Canada survey of more than 100 individuals working in the field of biodiversity education in private, non-profit or governmental organizations and agencies.

This paper is based on a 1998 report entitled: *Learning About Biodiversity*. The report was commissioned by the Biodiversity Convention Office of Environment Canada and was tabled in May 1998 as a background paper at the Global Biodiversity Forum, and at the fourth meeting of the Conference of the Parties to the Convention on Biological Diversity. Those interested in receiving a copy of *Learning About Biodiversity* are invited to contact http://www.cbin.ec.gc.ca/Biodiversity/En/BCO/default.cfm

2 MAIN TEXT

2.1 Targeting specific audiences

Biodiversity conservation and sustainable use are global issues that require broad societal changes. As a result, there is a widespread tendency to try to address them through mass-media campaigns designed to educate the public at large. A significant body of educational research disputes such an approach. Rather than attempting to reach vast, generalized public audiences, it emphasizes the importance of designing education initiatives for specific groups within specific contexts. This targeted approach is supported by contemporary models of learning which argue that knowledge is dependent upon context and actively constructed and reconstructed within the world of real practice (Erickson and MacKinnon, 1991; MacKinnon, 1994; von Glaserfeld, 1995). Programs designed to create a generalized understanding of biodiversity are, therefore, less effective than those targeted toward a functional understanding of problem-specific biodiversity concepts (Miller, 1983).

These findings also have implications for the ways in which public understanding of biodiversity should be evaluated. A number of researchers have challenged the value of mass surveys designed to test public understanding of environment and science (Morgan, 1984; Layton *et al*, 1993). They argue that such testing fails to respect the context-dependent nature of knowledge, and the fact that individuals differ in their selection of issues to which they are prepared to devote time and effort. Rather than use generalized surveys, Layton *et al* (1993) emphasize the importance of measuring how certain segments of the population understand the specific biodiversity issues they are facing. Given that biodiversity learning is strongly related to context, attempts to measure understanding should also reflect context.

2.2 The social context of learning

A body of educational research recognizes the social nature of learning; the importance of directing learning toward socially-identifiable goals that yield "actionable knowledge". This phenomenon is illustrated by community participation in a purple loosestrife irradication program. Purple loosestrife is a non-native plant that has severe impact on indigenous biodiversity. *The Purple Loosestrife Plant Exchange* promotes awareness about invasive

plants while introducing gardeners to alternative, ecologically-sound perennials. In 1998, eighteen garden centers offered one four-inch perennial to each customer who brought in a purple loosestrife plant, roots and all, from his or her garden. Homeowners engaged in the purple loosestrife exchange share information. The social circumstances that comprise the experience are essential to the learning process (Garnier, Ulanovskay and Vernarz, 1991).

Research into the ways families learn science in informal settings reveals the importance of developing educational programs that foster social interactions within the family group (Diamond, 1986; Kellert and Dunlap, 1989). Rather than passively absorbing informaton, families learn best when they work on real projects with real scientists (Glasser, 1992). It is the fostering of social learning within the family, as well as within the scientific community, that is essential to the effectiveness of the educational endeavor.

2.3 Targeting sources of information

The way a message is conveyed, and who conveys it, is as important as what is being said (Weiss and Tschirhart, 1994; Howlett, 1991). According to Layton *et al* (1993), the interaction of adults with science is rarely, if ever, a narrowly-cognitive one. Understanding science-based concepts, such as biodiversity is not based on intellectual capability as much as on socio-institutional factors related to social access, trust and negotiation. Importance is given to the source of the science, and in particular, the extent to which the source is judged trustworthy and relevant to the learner's situation.

Cows and Fish is an integrated program that focuses on ensuring the biological richness of ranch land in Sourthern Alberta. *Cows and Fish* takes a cooperative approach to ranch management by involving landowners, producers, conservation groups and government agencies in problem solving from the start. *Cows and Fish* builds upon the valuable knowledge that ranchers have regarding their land, and supplements it when necessary to develop an integrated management plan. Finally, the ranchers themselves become teachers involved in helping to spread strategies for biodiversity management to other livestock producers across the region. The success of this program is shaped by the extent to which trusted sources are engaged in program development and implementation.

In their studies of relationships between farmers and policy makers, van Woerkum, van de Poel and Aarts (1993) reveal that farmers understood policies, but their lack of trust in the policy makers as a knowledgeable source prevented them from using the information provided. On the other hand, studies by Layton *et al* (1993) and Wynne (1991) indicate that, when science is conveyed by a trustworthy source and seen as articulating individual's concerns, these individuals demonstrate considerable resourcefulness in locating sources and an impressive capability in translating science into practical action.

2.4 Attention to attitudes

There is a tendency to act as if the only important thing about learning is the manipulation of information in the learner's mind (Csikszentmihalyi, 1987). This fuels a common but erroneous assumption that biodiversity action can be brought about simply by presenting people with information about animals or environments and explaining the problems that confront them (Volk, Hungerford and Tomera, 1984; Hines, Hungerford and Tomera, 1986; McClaren, 1993). Learning involves the whole person, not just the rational mind. "It involves the sense, the desires, the longings, the feeling and the motivations as well (Csikszentmihalyi, 1987:81)." There is significant evidence that the affective, or emotional, domain is key to environmental education (Iozzi, 1989; Bardwell, 1993). The attitude an individual holds toward a particular issue may be simple or complex, stable or unstable, but is largely determined by the individual's existing values and beliefs (Petty and Cacioppo, 1981; Peyton and Decker, 1987).

Since 1993, *Learning Grounds* has been supporting Canadian communities in their efforts to transform school yards from sterile asphalt and turf grass to complex environments. *Learning Grounds* supports schools in creating an outdoor classroom while using the very process of restoration as a tool for experiential learning. *Learning Grounds* includes more than 1100

partner schools to date, from across the Country. Here, participation is not simply a case of "I tell you what to do and you participate" but something much more profound than this—real control over decisions and the power to carry out that which has been decided. True participation in the decision-making process is critical, as it is the means by which attitudes towards a project can be negotiated and commitment gained.

2.5 Constructing perceptions of biodiversity

People are not empty vessels waiting to be filled with new knowledge. Decades of educational research indicates that recipients of scientific knowledge are far from passive; they interact with the science, testing it against personal experience, contextualizing it by overlaying it with particular local knowledge and evaluating its social and institutional origins (Driver et al, 1996; Grimmett & Erickson, 1988; Larochelle & Desautels, 1992; Wynne, 1991). The cognitive-deficit model, with its assumption of a one-way flow of scientific information from scientists to the public is an inadequate description of the relationship.

In her research into children's conceptions of biodiversity, Palmer (1995) concluded that children already hold strong beliefs about distant environments and related concepts of biodiversity when they enter school. This knowledge affects how they interpret new information and experiences. Similarly, Driver *et al* (1996) revealed that young people hold many widely shared interpretations and explanations of phenomena in the natural world. These interpretations often differ from accepted scientific views and are extremely resistant to change.

Recognition that individuals—even young children—hold beliefs about biodiversity demands educational models that encourage people to explore their own existing knowledge and beliefs about biodiversity, in contrast with societally-held views. Students involved in the *National Environmental Education Program for Fist National Youth* are encouraged to explore their understanding of biodiversity through both western science and traditional ecological knowledge. Projects like this, highlight multiple perspectives and provide an important opportunity for learners to challenge their own beliefs and to more critically analyze the various social paradigms that underlie biodiversity debates.

2.6 Responsible treatment of controversial issues

Biodiversity issues are by their very nature, controversial. Competing economic, environmental, social and cultural values shape the ways in which the goals of the Convention on Biological Diversity are understood and realized. Unlike advocacy campaigns which tell people what to think, responsible biodiversity education must be concerned with helping learners better understand their own values and to develop the processes and skills they need to think critically and to make their own, well-informed decisions (Aikenhead,1983; Kormondy, 1984; Werner, 1989). The difference between indoctrination and education lies in part in how value issues and moral questions are dealt with. Learners should be given the skills to make future decisions for themselves rather than merely be persuaded or manipulated. Ultimately people need to be able to make their own moral decisions about environmental matters. The job of educators is to ensure that individuals have the tools necessary to make responsible environmental decisions (Newhouse, 1990).

2.7 Trans-Disciplinary, Trans-Boundary

Biodiversity education is based on the premise that no subjects, factors or issues exist in isolation. Trans-disciplinary means breaking free of disciplinary perceptions and traditions to create new meanings, understandings and ways of working (Sterling, 1996). Bridging the boundary between expert and amateur enthusiast is critical in terms of building capacity to accomplish the goals of the Biodiversity Convention. For example, less than 40 per cent of all the species found in Canada have been identified, and of these, little is known of their distribution, ecosystem function, needs, value or security. At the same time there is a world-wide shortage of scientists trained to do this work. Programs, such as *The Great Canadian Bio-Blitz* which combine the efforts of specialists in taxonomy, ecology, and natural history with the enthusiasm of local volunteers in an intensive, 24 hour period of flora and fauna inventorying, have had promising results. These initiatives link scientific resources with community energy and bring about a deeper understanding of biodiversity to all involved.

3 CONCLUSION

The theories and practices described in this paper encourage us to move beyond the stereotype of education as the transmission of information to children in schools. Such stereotyping is common and dangerous. Not only does it greatly oversimplify the complexity of effective schooling, but also, more fundamentally, it prevents biodiversity planners and decision makers from seeing the contribution that educational theory and practice can make to the myriad of contexts the Convention seeks to address. If biodiversity education is to help transform the ways we interact with the diversity of life on earth, restrictive and dated conceptions of education must themselves be transformed.

4 REFERENCES

Bardwell, L. (1992). Success Stories: Imagery by Example. *Journal of Environmental Education, 23(1), 5-10.*

Csikszentmihalyi, M. (1987,). *Human Behaviour and the Science Center*. Paper presented at the Science Learning in the Informal Setting, Chicago.

Diamond, J. (1986). The behaviour of family groups in science museums. *Curator, 29(2), 139-155.*

Driver, R., Leach,J., Millar, R., and Scott, P. (1996). *Young People's Images of Science*. Buckingham, Philadelphia: Open University Press.

Erickson, G. M., A. (1991). Seeing classrooms in new ways: On becoming a science teacher. In D. Schon (Ed.), *The reflective turn: Case studies in professional practice, (pp. 15-36).* New York: Teachers College Press.

Garnier, C., Ulanovskay, I., and Bernarz, N. (Ed.). (1991). *Apres Vigotski et Piaget: Perspectives sociale et perspective constuctiviste*. Bruxelles: De Boeck.: Ecoles russe et occidentale.

Glaser, R. (1992). Expert knowledge and processes of thinking. In D. Halpen (Ed.), *Enhancing thinking skills in the sciences and mathematics*, . Hillsdale, N.J: Lawrence Erlbaum.

Grimmett, P. and Erickson, G. (1988). *Reflection in Teacher Education*. Vancouver: Pacific Educational Press.

Hart, R. A. (1997). *Children's Participation: The Theory and Practice of Involving Young Citizens in Community Development and Environmental Care*. London: Earth Scan.

Hines, J. M., Hungerford, H. R. and A.N. Tomera. (1986). Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis. *The Journal of Environmental Education, 18(2), 1-8.*

Howlett, M. (1991). Policy instruments, policy styles, and policy implementation: national approaches to the theory of instrument choice. *Policy Studies Journal, 19(2), 1-21.*

Huckle, J. and Sterling, S. (Eds.). (1996). Education for Sustainability. London: Earthscan.

Iozzi, L. A. (1989). What Research Says to the Educator. Part One: Environmental Education and the Affective Domain. *Journal of Environmental Education, 20(3).*

Kellert, S. R. & Dunlap, J. (1989). *Informal Learning at the Zoo: A Study of Attitude and Knowledge Impacts* . Philadelphia: Zoological Society of Philadelphia.

Kormondy, E. J. (1984). Human Ecology: An Introduction for Biology Teachers. *The American Biology Teacher, 46(6), 325-329.*

Larochelle, M., and Desautels, J. (1991). Of course, it's just obvious: Adolescents' ideas of scientific knowledge. *International Journal of Science Education, 13(4), 373-89.*

Layton, D. J., Jenkins, E., Macgill, S., and Davey, A. (1993). *Inarticulate Science? Perspectives on the Public Understanding of Science and Some Implications for Science Education.* Nafferton: Studies in Education Ltd.

MacKinnon, A. (1994,). *Examining practice to address policy problems in teacher education.* Paper presented at the Institute for Studies in Teacher Education: Collaborative research in teacher education: The SFU experience, Burnaby, BC.

McClaren, M. (1993). *Model for Environmental Literacy.* Paper presented at the National Marine Educators Association Western Regional Conference, Vancouver Island, BC.

Miller, J. (1983). Science literacy: A conceptual and empirical review. *Daedalus, 112(2),2948.*

Morgan, J. (1984). Effect of antenatal education on expectant parents' knowledge and attitudes regarding infant nutrition. *Health Education Journal, 43(4), 104-7.*

Newhouse, N. (1990). Implications of Attitude and Behavior Research for Environmental Conservation. *Journal of Environmental Education, 22(1), 26-32.*

Palmer, J. (1995). *Children's Concepts of Biodiversity.* Paper presented at the Education and Communication for Biodiversity Workshop, Valsain, Spain.

Petty, R. E. and Cacioppo J. T. (1981). *Attitudes and Persuasion: Classical and Contemporary Approaches.* Dudugue, IA: William C. Brown.

Peyton, R. B and Decker, D. J. (1987). The Role of Values and Valuing in Wildlife Communication and Education. In D. J. G. Decker, G.R. (Ed.), *Valuing Wildlife: Economic and Social Perspectives,* . Boulder, CO: Westview Press.

Sterling, S. (1996). Education in Change. In J. Huckle, and S. Sterling (Eds.), *Education for Sustainability, (pp. 18-40).* London: Earthscan.

van Woerkum, C. M. J., van de Poel, M. M, and Aarts, M. N. C.,. (1995). *Communication in Policy Processes: Reflections from the Netherlands.*

Volk, T. R., Hungerford, H. R., and Tomera, A. N. (1984). A National Survey of Curriculum Needs as Perceived by Professional Environmental Educators. *The Journal of Environmental Education, 16(1), 36-40.*

von Glasersfeld, E. (1995). *Radical constructivism. A way of knowing and learning.* London: Falmer Press.

Weiss, J. A. and Tschirhart, M. (1994). Public information campaigns as policy instruments. *Journal of Policy Analysis and Management, 13(1), 82-119.*

Werner, W. (1989). *What is Global Education?* Paper presented at The School's Role in Global Education Conference, Vancouver.

Wynne, B. (1991). Knowledges in Context. *Science, Technology and Human Values, 16(1), 111-21.*

ECOLOGICAL EDUCATION IN RUSSIA AS A GEOGRAPHICAL PROBLEM

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The curriculum at secondary school in Russia includes "ecology" as an important subject. This subject is important not only for knowledge but for moral education. Studying ecology helps us to understand units of nature and human mind so to fix the place of oneself in the modern world. Now we can keep an eye on development of ecological crises in the world. The crisis conditions are well known in earth history, but all of them were evoked by natural causes. The modern crisis is evoked by human activity, but all of them were evoked by natural causes. The modern crisis is evoked by human activity, whose impact has become equal to the impact of geological influences. That is why geographical aspects of ecological education are especially important. Geography is a science, which has two branches. One of them concerns nature and another is about society. Therefore one is able to explain some conformity for natural laws of steady interaction between humanity and nature. The modern conception of steady development lies in the centre of scientific and educational geography. This is the only way for ensuring human survival. This author suggests a program of continuous ecological education. The beginning of this education should be in the kindergarten, where children get their first elements of ecological upbringing. As a result they begin to understand the rules of conduct in their surroundings. The next stage of ecological education is the primary school, where pupils become acquainted with organic and inorganic elements of nature. They learn variety, unity and a holistic view of the world and develop their ecological 'culture'. In secondary school pupils learn classical ecology, geographical ecology and social ecology. Step by step children get to know how research works. They take part in many ecological projects, for example, in Russia "The friends of the Finnish Gulf", "The Northern Forests" and so on. For children it is very important to check on their ecological knowledge through participation in Ecological Olympiads, which take place in Russia and in other countries every year. In summer children take part in ecological camps, where they observe the surrounding environments. So, a combination of arranged ecological behaviour is the way to become a human of the XXI Century.

THE ECOLOGICAL EDUCATION IN RUSSIA AS A GEOGRAPHICAL PROBLEM.

Alexander Nickolaevich Lyubarsky

The new statement policy of education in Russia is just forming now. They hope education in Russia will be more contemporary and our Russian School exerts every effort to turn out to studying although early we regarded nature only as sources of raw materials. Therefore they suggest of ecological education in Russia will be developing. Ecology must be the subject for compulsory education because the ecological problem is one of the most important for human. Our children must realise that human and nature are interdependence. In consequence they must develop human attitude to life. Some elements of ecology are included in different subjects of curriculum: chemistry, biology, physics, economics, geography. This model of education must broaden outlook of pupils. It helps understanding that they will be responsible for our planet in the twenty-first century. The aim of secondary school is to prepare pupils for appreciating the value of natural resources, degree of their utilisation, pollution not falling into decline, irretrievable changing in natural complex. This training contributes to forming the competent ecological mentality it is impossible for the young people today to preserve our Earth for future generation. Many areas of our planet, including Russia, are in difficult ecological situation now. In Russia they are: The North region, where the considerable part of mineral raw materials in concentrated, The North part of Caspian Sea area, Middle Volga area, Kama area, Cola peninsula, Ural, Kuznetsky coal basin, South Baikal, Sanct-Petersburg area and other regions. There are many sources of pollution in these regions and areas. For example, Sanct-Petersburg has more then 44 000 permanent sour of air pollution. Their total volume exceed 400 000 tons dust, sulphur anhydride and other unhealthy substances. Pollution touches upon the problem ofphysic-geographical features, including atmosphere, soils, waters, forests and so on. The same problem is typical for other regions of Russia. That iswhy were created two levels of ecological education in our country. The first level is federal programme. The second level is regional programme. Federal programme contains general aims and tasks.

Regional programme takes into consideration regional particulars. The principles, which lie in basis ecological education are: humanisation and integration of educational subjects.
In this connection the role of geography as an educational subject is particularly important. It teaches to understand and appreciate complicated system of communications between people and nature. As a result they suggest that pupils will have acquired ecological culture studying geography. Knowledge about different kinds of complicated interaction in nature is integrated ecological-biological and ecological-social. Moral attitude to nature as prohibition of damage to it is being formed. In Russia as in Europe and in America, geographical education moves to the integrated geographical knowledge. It is very important to pay attention to complex analysis of territory as a method of the conception of steady development. The of steady development is defined as development, which satisfies of requirements nowadays, but does not influence the ability of future generations to satisfy their requirements. It includes two basic concepts: a concept of requirements and a concept of restriction. According this definition it is a necessary limit birth-rate for giving equal to death-rate, to equalise tempos of renewing resource consumption and working out steady substitution of resources. Some harmonisation between development humane and development of nature must be obtained during future. This thetas was proclaimed on the conference devoted to nature protection in Rio (de) Janeiro in 1992 and was advised to school syllabuses. The main contribution to the solution of this problem, undoubtedly, will be belong to geography. As a consequence geography will be the leading subject of ecological education not only now, but in the nearest future. It is necessary to make out some principles of geography educational. The first principle is humanisation of education. It contains putting a person in the centre of natural processes and phenomenon's. The main task of this principle is to draw knowledge from adjoining with geography subjects:history, economics, sociology and others. It can show the character of influence natural phenomena on way of life, culture, and from the other side the character of some person influence on natural phenomena. We know that in different regions these connections are not equal. There are many positive and negative examples.
Principle of humanisation of education is closely connected with other principle- principle of educational ecologisation. The meaning

of this principle is inputting some elements of ecology in different subjects. In curricula the themes devoted to defence of nature must be including into other subjects. It is very important to show that all phenomena in the nature and in the society are contradicted and integrated simultaneously, that they have past, present and future. This positions are foundation for development of education.
Proceed from the idea that these questions are enough difficult for studding they demand some new didactic approaches to teaching natural sciences and, first of all, ecology. Ecological education in Russia will be really qualitative, if some problems, which stand before school ecology can be solved. They are the following.

1. To determine the place of ecology in curricula.
2. To work out clear structure of ecological teaching as a school subject.
3. To select the content of school ecology.
4. To prepare and to publish foundation textbooks on ecology.
5. To create scientifically well-founded, effective methods for teaching ecology.

These problems lean against a single, deeply considerable conception of ecological education. Only after overcoming indicated difficulties, forming standards of ecological culture, which are created during making the programme"The school of future", the future of school ecology can be presented in clear prospects. The opening move on the way of solving ecological problems must be Russian federal component of ecological education standard. Standard in education means the system of main parameters passing as the state norm of erudition. The ecological education standard is a norm document, which regulates quality of education, works up demands of it's structure, subject, level of training Russian pupils. The federal standard must be directed to secure equal possibilities in having a secondary education. It must create conditions for integration Russian School into international educational system.
The standard forces studying ecology from the first till of the eleventh form. In the first form pupils get familiar with objects alive and death nature. They study to make out them and give proof for their choice. As a result they master practical knowledge of analytical mentality. Gradually they have been forming a true notion of natural scientific picture of the outside world. The pupils learn to describe some objects of alive nature with the help of all possible

scientific methods: method of observation(they accomplish some excursions to a nature and observe some objects of living nature in their classroom); method of comparison(they reveal the features of similarity and distinction between characteristics of natural objects); statistical method(they study to group the results of observation in tabular order). All methods have the definite aim:to facilitate development of children notion of nature as an integrated system of the natural components and to create an impression that nature and human are being a single. From the second to fifth form in curricula there are such a subject as studding of nature. It makes it possible to develop the practical knowledge and acquire new skills. The pupils not only study individual objects of nature, but go into the question of nature as a whole. With great interest
children acquire knowledge, master new methods observation. They study the behaviour of species, the special features their vital functions, observe natural phenomena's during various seasons, make experiments to study out the sprout and development of species without doing damage to them. Many schools in Russia put into their curricula geography as a very
important subject for comprehension of ecological regularities, beginning from the second form. In other schools pupils begin to study geography from the sixth form. Study geography in early age is very important because children can realise better the objective laws of nature of the external world. Geography as a subject enables pupils to catch variety of modern world and it's unity. They can compare far distance and near distance and then say that far distance is clear for them. After realising of primary school begin to change their ecological mentality.Their ecological competence becomes wide and they acquire new skills for defence of nature. Next stage of ecological education is in secondary school, where pupils begin acquaintance with interaction between biological system and environment. They learn that biological systems have hierarchical organisation. Therefore, uniting their components in system of more large-scale, they acquire new qualities. These qualities are impossible to predicate in advance,proceeding from the supposition about known features of system components. Understanding of this principle(emergency principle) makes it possible for pupils to catch why classical ecology is divided into three parts: autecology, demecology, sinecology. They differ in levels of living system organisation, including forms of substances, energy

and information. If adopted as fundamental study of the principles of species ecology-demecology and named it "system", it would be clearly for pupils, that autecology may be consider as undersystem.Then sinecology must be considered as oversystem. In result pupils successfully sum up knowledge of ecological- biological interaction, which is one of the most important problems of ecology. The ecological erudition can not take place without holding of global ecology problems. It is important to know humane ecology and social ecology. The pupils must understand, that human is a living creature, that his surroundings are natural, social, industrial, housing spheres. Their qualities have direct influence on health of not only one person, but all human society. It means that support of human as the species helps the healthy way of life: activity, responsibility, intensive labour, birth and bringing up of child, happiness.

The last part of ecological programme is "the theme "social ecology". Studying this theme pupils must learn interaction between the public and surroundings, not excluding some contradictions. They must realise the conditions of ecological cultural forming. It ultimate the aim of the modern science in making information-ecological society. Studying ecology pupils develop and complicate their practical skills, including those connected with research activity. Therefore the demands of ecological erudition suppose mastering as scientific research methods, as well as practical skills. The school leavers must be able to observe natural subject interactions, to describe the results of the observation, to form some research problems and look the solution. They must understand what ecological monitoring means. They must learn not only the skill of giving diagnosis of contemporary condition surrounds, but must be able to predict future condition. A possible way of predict the future is making elementary geoecological maps. These maps contain such information as physical, chemical, biological, aesthetic forms of influence on surroundings. They are one of the ecological monitoring method. If they are made during successive intervals, it would be very useful for predicting changing of surrounds.

School ecological education in Russia is being formed now. This process faces many methodological problems. Their solving will allow in the nearest future to take up the leading place in educational process.

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A RISING TIDE: PROMOTING CARE AND UNDERSTANDING OF OUR OCEANS THROUGH GEOGRAPHICAL SCIENCE, RESEARCH AND ENVIRONMENTAL EDUCATION

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Our oceans are critical to life on earth and have influenced the global economy. With rising world population and the threats associated with sea level rise, natural and anthropogenic pressures, demands on our coastal zone resources are increasing at an alarming rate. Recognising the need to raise awareness of the significance and value of our oceans the UN designated 1998 International Year of the Oceans (IYO). IYO provided opportunities to focus education at many different scales, from local activities and national events to international meetings.

A well informed and participatory community with a sense of stewardship embracing individual environmental responsibility is critical to achieve sustainable management of ocean resources. Trained professionals are a vital resource to ensure a balance between socio economic benefits of marine resource exploitation and environmental protection.

Drawing on examples from around the world, this paper looks at formal and informal marine environmental science provision. It assesses the value of international initiatives such as IYO. A selection of school, higher education and professional development programmes are examined and evaluated. The growth in public understanding of science activities and the informal education opportunities presented by aquaria, marine science centres, electronic media and technology is used to highlight the scope for encouraging a more scientifically literate public.

The conclusions emphasise the shortfalls and opportunities in current marine environmental science education. A large number of recommendations are made including the need for professional science communicators, provision of a greater range of educational resources, teacher training in marine education and more effective networking systems.